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American Journal of Public Health

And *The Nation's Health*

Volume XX April 1930 Number 4

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REPORT OF COMMITTEE

Fifty-Ninth Annual Meeting
Fort Worth, Texas, October 27–30, 1930

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American Journal of Public Health
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Volume XX April, 1930 Number 4

Established Points in a Community Program of Health Education*

The Health Department's Program

HENRY F. VAUGHAN, D. P. H., F. A. P. H. A.
Commissioner of Health, Detroit, Mich.

THE American Public Health Association in preparing its *Appraisal Forms* for city and rural health work has endeavored to create a measuring stick which incorporates, in terms of group judgment, established points in a communal program of health education. A very important section of the *Appraisal Form* is devoted to popular health instruction in which tangible means of measuring the quantity and the effectiveness of recognized implements of health instruction have been incorporated.

The use of pamphlets, lectures, talks and motion pictures, as well as publicity through daily and weekly newspapers and the publication of bulletins and periodic reports giving account of the activities of the health department and special demonstrations aiming to promote the cause of public health, have all been given numerical value with the view of offering a comparison of the intensity of the educational program in various communities. A further perusal of this same *Appraisal Form* will indicate that throughout the text, in sections devoted to other recognized divisions of health administration, further numerical value is given to methods of procedure which might be placed under the caption "health instruction." The graphic presentation of death rates, the publication of statistical reports, and the use of spot maps and chronological charts, are the invaluable tools of the health educator, and constitute the very foundation stone for the vital statistician and the epidemiologist. The section of the *Appraisal Form* dealing

* Read before the Public Health Education Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 1, 1929.

with the health of the school child includes features of health education in the schoolroom and the section on sanitation gives tangible value to the instruction of food handlers.

In addition to these well defined uses of the printed page and courses of instruction dedicated to such specific projects as the supervision of food handlers, we must not overlook the most widely accepted factor in the community program of health education—the public health nurse. The effectiveness of the nursing work is measured on the appraisal yardstick by the degree to which the public responds, as evidenced by the attendance at tuberculosis and venereal disease clinics, the frequency with which the mother avails herself of prenatal instruction, and later takes her child to the infant and preschool clinics. All of these established features of a properly organized health education program are now generally recognized and accepted by the health administrator throughout the land. It is not the purpose of this paper to refer in detail to these implements of education so admirably evaluated by this Association, but rather to discuss certain aspects of the mechanics for the application of these generally recognized principles.

It is one of the prime functions of a health officer, either by himself or through his organized department, to keep the public informed regarding the activities of his organization. This can best be done through the medium of the newspaper by describing in readable and understandable English those routine services which affect the common citizen in his daily life. There is no universal prescription; individuality and personality will vary the pictorial presentation. The people of one city may demand the sensational and unusual. The health officer is never justified in sacrificing the accepted and proven facts of health for the sensational and startling portrayals of unproven and doubtful origin. He is most successful who can mix the dry language and statistics of the scientist with the highly colored portrayals of the modern commercial advertiser.

Many health administrators have worked out a coöperative arrangement with newspaper editors whereby an article describing some feature of the health department's activities is accepted at least once a week. Such article may appear either as a news item or as a special contribution under the name of the author, or as a feature story for the Sunday edition. Pictures are invaluable in reaching the reader.

Too many annual reports of purely statistical character are published by health departments. For the most part they are wasteful of paper. Very few individuals read the details. It seems to be a tradition among health officers to publish a report which may contain

a short introduction by the administrator, but which consists largely of disjointed, poorly prepared and inadequately presented departmental reports. How much better to present a logically yet simply told story of the activities for the past year, giving only the high lights of statistical importance, such as the total death and birth rates and the death rates from the more important causes. The annual report may well be an account of the activities of each of the divisions and sub-divisions of the department, told in an informal and coherent fashion and not as a formal, choppy and jumbled statement from the director of this or that division. Preferably the same author should prepare the entire report, or at least one individual should serve as editor so that phraseology and method will be consistent.

Another important function of the health department is to keep the public informed concerning the prevalence of disease and the possible influence of epidemics on the health of the local community. A weekly bulletin printed by the health department or merely released and published by the newspaper will serve this purpose admirably. It is needless to state that such releases should be made to all papers whether printed in English or foreign languages. In case of epidemic the public should be informed daily of the facts. Health as a news feature has always received due consideration from the newspaper editor. The reader is especially interested in knowing the means of disease prevention and relief in time of epidemic.

It is understood that all health departments do not perform the same services although there is a background common to all. If some of these services, such as centers for maternal, child hygiene and preschool guidance, tuberculosis and social hygiene are under the supervision of nonofficial agencies, the obligation of the latter in keeping the public informed concerning their activities is as real as would be the responsibility of the health officer were they under his direction. In most instances the nonofficial agencies serve to supplement the official health organization or serve as units of demonstration to convince the public of the need of some particular activity. So far as the communal health program is concerned, both the official and the nonofficial should be considered as a single unit.

The most important task of the health department in developing a health education program is not to take care of the unusual situation which develops during an epidemic period; it is not to describe the mechanics of operating a department or even to notify the public of the prevalence of the various communicable diseases; but rather to build up a system whereby a health consciousness will become established in the mind of each citizen.

After eliminating the multitude of local variables such as climate, race, nativity, color, age, etc., we believe that the death rate from any specific preventable disease reflects the degree to which popular health instruction has stimulated a response on the part of the individual members of the community group and found reflection in the application of the principles of personal hygiene and healthy living. After making the necessary statistical corrections and allowing for abnormal local influences which may result in a more liberal policy with respect to the hospitalization and care of cases at public expense, the tuberculosis death rate may be taken as an index of the local health consciousness with respect to tuberculosis prevention; that is, of the intelligence and learning of the average citizen with respect to the known facts concerning the cure and prevention of this particular disease.

What is true of tuberculosis is likewise true of other communicable diseases such as typhoid fever, diphtheria and scarlet fever. It is especially true of the infant death rate, which serves as an admirable index of the end results of health education in the conservation of child life.

It should therefore be an objective of the health officer to stimulate this condition of health consciousness so that by degrees the citizen automatically incorporates into his daily habits the practice of personal hygiene, and secures for himself and his family the specific means of stimulating artificial protection against such diseases as diphtheria and smallpox. The methods of the commercial advertiser which the medical quacks and charlatans have used so profitably in their business may well be utilized by the health officer. As previously stated, sensationalism should not be utilized at the expense of truth, but a modernistic tendency in the presentation of simple facts will do much to stimulate response from the laymen. The educational program should be built on the best known scientific foundations.

Why not use the successful methods of the commercial advertiser? When an automobile manufacturer is ready to present a new model to the consuming public, he tells the advertising house which handles his account that he has four-wheel brakes, a non-shatterable wind-shield, an automatic lubricating system, demountable tires, etc. The commercial advertiser then builds his story about these new features. He does not have to resort to his imagination but has these new improvements in automotive engineering to offer the public. Throughout his advertising scheme there is a continuity of program—a catchword or phrase which the public learns to associate with his product, such as "Ask the Man Who Owns One," or, "When Better Automobiles are Built, ——— Will Build Them." The automobile manufacturer is

not alone in this field of advertising; it has been adopted for every type of product with such captions as "Not a Cough in a Carload," and "That Schoolgirl Complexion."

Health officers with their academic and professional limitations have made beginnings but much remains to be accomplished. The aptly coined phrase of Biggs: "Public Health is purchasable; within reasonable limits any community can determine its own death rate," has seen wide usage but has not had the personal appeal that has accompanied the undertakings of commercial enterprises.

What has the health officer to sell? For the prenatal case, there is a physical examination with pelvic measurements and a periodic urinalysis; for the mother and child, a safe confinement under hospital conditions, with well trained personnel in attendance; for the infant, supervision of the milk and food, proper rest, suitable clothing, sunbaths, avoidance of excesses. Later there is the period for vaccination against smallpox and immunization against diphtheria. By the time of the first birthday the periodic medical examination should become an accepted fact to be continued through the preschool and school periods, accompanied by the correction of physical defects.

If the health officer could go to the commercial advertiser and present not a new motor car with self-lubricating devices and nonshatterable glass, but a service for the expectant mother, immunization against diphtheria, vaccination against smallpox, the periodic physical examination, great advance could be made in carrying to the parents, and especially the mothers, a consciousness of the fact that they are responsible for the health of their children, and that the application of preventive measures early in life will do much to reduce a high infant death rate and to ward off the communicable diseases so prevalent in the preschool group.

All material of a medical character used in such an educational program should, of course, have the approval of the properly organized medical society. There should be no tendency toward paternalism. The state or city should not perform services which belong rightfully to the parent, except in so far as demonstration is needed and the relief of indigency is compelled.

Attempts have been made in this direction with notable success, although in some instances there has been a tendency to substitute standardized prescriptions for the individual attention of the practicing physician. In our judgment this is a mistake. The condition should never arise whereby reference to a guidebook becomes a substitute for a physical examination at the hands of the family physician—rather should the educational program prove the value of his service.

There should be a continuity of program throughout the entire story, closely interwoven with the personal service and demonstration offered by the public health nurse, for whom the printed page can never serve as a substitute.

The machinery through which such an educational program can be put into effect is variable. There are marriage statistics which afford one means of approach to the prenatal case. There are the birth certificates which give a ready and immediate contact with the mother of the new-born child. Literature delivered by the public health nurse with a word of explanation will obtain better results than when sent through the mail.

We are not endeavoring to mention all the ingenuous methods which have been or may be employed in making contacts in a given field. Suffice it to say that the possibilities are large and, though brave beginnings have been made, no well planned modernistic instruction combining the resources of the public health nurse and the printed page has been consummated. As the nearest approach to what we have in mind we might cite the splendid program inaugurated by Herman N. Bundesen, M.D., as Health Commissioner of Chicago. Doubtless his word did much to stimulate a health consciousness on the part of the people in Chicago and if so it will find reflection in a lowered morbidity and mortality rate for that city.

Let us again repeat that the official and nonofficial agencies must supplement each other in their program of health education. The facts to be presented must be built upon the knowledge which comes to the health officer largely through his division of vital statistics supplemented by research and epidemiological study. The art of modern advertising remains still to be applied in the public health field.

Medical Care of School Children in Hesse, Germany

A VERY thorough system of medical care of elementary school and continuation school children has been recently introduced by a Government decree in the State of Hesse. Each pupil must be given a physical examination at the time of entering school; at least once during his school career; and again at the time of graduation, when he is also given vocational advice. In addition, the school physician must also make a less thorough inspection of every child once a year.

The local authorities are ordered to introduce dental care in every school, if possible. Children whose physical condition is not very satisfactory are to be examined at regular intervals to be determined by the school physician. Individual health records are to be kept. The school physician will be assisted in the work by school nurses or welfare workers.—*Deutsche Ztschr. f. Wohlfartspflege,* Berlin, Dec., 1929, p. 597.

Water Treatment With Chlorinated Copperas*

A. CLINTON DECKER, F. A. P. H. A., AND H. G. MENKE

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DURING January, 1928, it was decided by the Chickasaw Utilities Company and the Alabama Water Service Company to install additional facilities at the Water Works Plant at Chickasaw, Ala. These additions were to include equipment to afford full treatment for color removal, clarification and disinfection.

The Chickasaw Plant is owned by the Chickasaw Utilities Company, a subsidiary of the United States Steel Corporation, and was leased early in 1928 to the Alabama Water Service Company to supply water to the towns of Chickasaw and Pritchard. Chickasaw was built by the United States Steel Corporation during the war to provide housing for the employees of the Chickasaw Shipbuilding Company, a subsidiary of the Corporation. It is about seven miles north of Mobile and has a population of about 2,000. It is un-incorporated. Pritchard, with a population of about 1,500, is about one mile from Chickasaw, and is incorporated.

At the time Chickasaw was built the water works system constructed was large enough to supply the domestic and fire protection requirements of the village and plant.

Investigations of possible sources of supply included wells and surface water. Due to the chemical content of the well water and the large number of wells required, it was decided to use Eight Mile Creek. This stream originates in springs and flows through a heavily cypress wooded territory, which imparts a color ranging from 40 to 130 p.p.m. The turbidity normally varies from 3 to 25, and on very rare occasions reaches 50. The alkalinity ranges from 2 to 5 p.p.m., and constitutes the total hardness. The pH varies from 5.5 to 5.9. The bacterial content is unusually low for surface water, the count being mostly under 100 per c.c. at 37½° C.

* Read before the Public Health Engineering Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 2, 1929.

The original treatment consisted of sedimentation and chlorination. The sedimentation basin was composed of two units, each having a capacity of 500,000 gal., into which water was pumped with a low lift pump. From this it was lifted to the 200,000 gal.-elevated steel storage tank, being chlorinated as it entered the high lift pump. The high lift pumping equipment consisted of one 1,200 gal. per minute and one 2,000 gal. per minute pump.

After the decision to provide full treatment, including color removal, at this plant, the method of treatment had to be determined. The interested companies, in coöperation with the State Board of Health, undertook experiments to determine the best method. The first experimental work was done in February and April, 1928, and consisted of both bottle experiments and the operation of an experimental filter. The latter consisted of barrel containers and orifice boxes for chemical dosing, mixing trough, coagulating basin, and filter. Water was siphoned from the sedimentation basin and mixed with the chemicals by means of a sloping herring-bone baffled trough. The coagulating basin was of plain lumber—roughly 3 ft. 4 in. x 6 ft. in plan and 6 ft. deep. This was divided into 3 compartments by round-the-end baffles. The filter was constructed from an ordinary hot water tank which gave it a surface of exactly 1 sq. ft. The rate of filtration was controlled by an adjustable hose through raising or lowering the discharge end.

The whole plant was designed to secure maximum flexibility in regard to time of mixing and chemical dosage. We used ferrous sulphate, alum, lime, and soda ash in various quantities and combinations. It was our opinion that the best results of coagulation and color removal were obtained when 3 gr. per gal. of lime and 5½ gr per gal. of alum were used. The raw water showed an alkalinity of 2, color 22, turbidity 3, and pH 6.0; the filtered an alkalinity of 8, color 0, turbidity 0, and pH 6.4. On the basis of these findings, it was concluded that a treatment plant could be operated satisfactorily and at a reasonable cost.

Plans were prepared in accordance with recommendations made as a result of the above experiments, and construction work was begun the first week in January, 1929. After the plant had been designed, the possibility of the use of chlorinated-copperas was brought to our attention by L. H. Enslow, Research Engineer of the Chlorine Institute. This, however, did not necessitate any change in the plans except in the chemical equipment.

Laboratory scale experiments preceded the plant scale demonstration made early in April, 1929, and both gave excellent color removal.

The best results were secured by employing 0.7 gr. per gal. of copperas previously oxidized by adding the amount of chlorine theoretically required to oxidize the ferrous iron (1.5 p.p.m.) and, in addition, sufficient to satisfy the chlorine demand of the raw water, making the total application 2.16 p.p.m. At the end of the mixing chamber 0.2 p.p.m. of residual chlorine was present in the coagulated water. Thus, copperas oxidation and prechlorination was effected simultaneously. In passage through the basins, however, the residual chlorine disappeared and the water going on the filters contained none. It was noted that when 0.4 gr. per gal. of sodium aluminate was used in conjunction with chlorinated-copperas the floc was somewhat more feathery in appearance and settled more rapidly than that produced by chlorinated-copperas alone.

There was no appreciable difference in the amount of color removal with either of the above methods of coagulation. When sodium aluminate was used, it was introduced in the third compartment of the mixing chamber, theoretically 3½ minutes after the introduction of the chlorinated-copperas. Coagulation was readily obtained with various dosages of chlorinated-copperas, or with chlorinated-copperas and sodium aluminate. However, the color removal was the factor in determining the minimum dosage, and although coagulation could be obtained with smaller dosage, color removal was not complete except with the amount stated. At times, when the floc seemed to be shrinking in size, our first point of investigation was the mixing barrel where the chlorine was being added to the copperas solution. Usually, upon applying the ferricyanide test for the presence of ferrous iron in the copperas-chlorine mixture leaving the barrel, the blue color was produced, indicating incomplete oxidation of the copperas. Because of this, the chlorine dosage was increased to 2.16 p.p.m. to insure an excess at all times, and likewise provide the prechlorination dosage desired.

Chlorinated-copperas[1, 2] is prepared by mixing a solution of ferrous sulphate ($FeSO_4:7H_2O$) commonly known to the trade as "copperas" and chlorine water from a chlorinator. The copperas may be fed from a dry feed machine into a solution box, or be made into solution in a tank and fed through orifice boxes. The function of the chlorine is to oxidize the ferrous iron before the solution reaches the raw water. It is evident that the same feed equipment employed for other coagulants is useful with chlorinated-copperas, the only addition being the chlorination equipment.

Provision had been made for introducing lime at various points in the last bay of the coagulating basin and also into the clear well. At

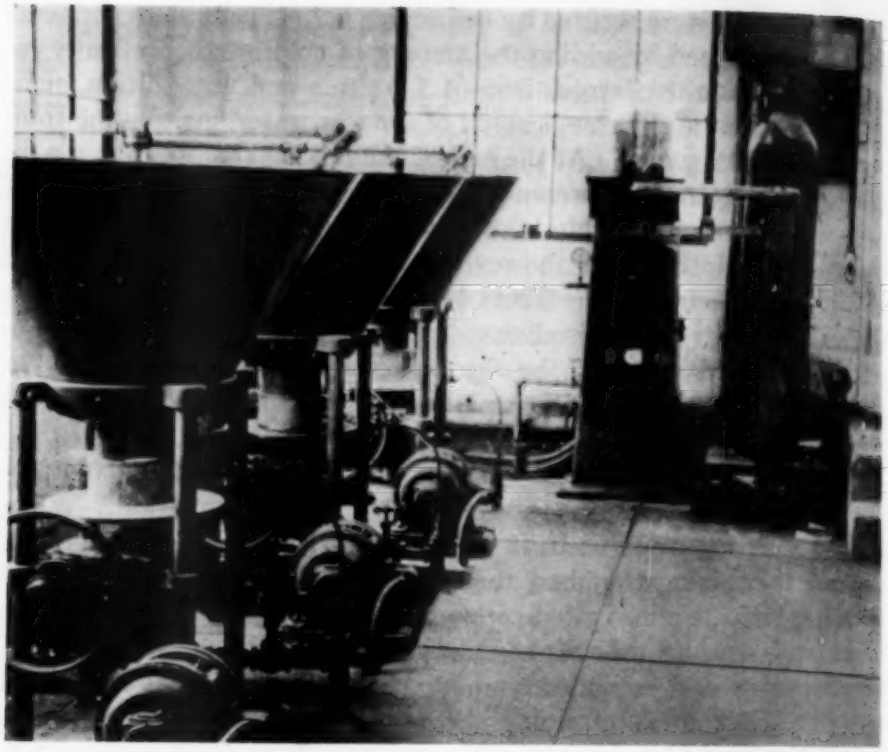

FIGURE I—Chemical Feed Machines

different times, lime was introduced at about 130 ft. and 50 ft. from the filters, and into the clear water well immediately adjacent to the filter effluent pipes. When lime was introduced into the coagulating basin, the final quality of water was not so satisfactory as when it was put into the clear water well. There was a slight increase in color in the latter case, but it was not so great in the finished water as when the lime was introduced into the coagulating basin. In all cases, lime sufficient to adjust the pH up to 7.0 or 7.2 was used. The alkalinity was raised to 7 or 8 p.p.m. The final color averaged about 3 p.p.m., and never exceeded 5. The effluent in regard to color and brilliance was eminently satisfactory. The appearance of the water was impaired when enough lime was added to correct the pH to the desired point of 7.4; i.e., the increase of color intensity was very noticeable when the pH was corrected to values above 7.2. On this account, the final water was left at pH between 7.0 and 7.2. At

FIGURE II—Chemical Feed Machines

times since, the lime application to the filtered water has produced a pH value of 8.0 without serious color increase.

When it had been determined that chlorinated-copperas could be used, the equipment selected was Wallace and Tiernan Type "B" Dry Feed Machines, and Type "M. S. V." Chlorinator (see Figures I and II). No mixing device had been provided for chlorinating the copperas, so when the plant was put into operation, it was necessary to improvise one. A 50-gal. barrel was placed on a bracket immediately adjacent to the first compartment of the mixing chamber. The copperas solution line from the dry feed machine was cut and so arranged as to lead into this barrel, discharging at the bottom, causing a swirling action in the barrel. An outlet pipe from the barrel into the mixing chamber was taken off at the top. Chlorine was introduced through the chlorinator discharge hose at a point near the bottom. The swirling action caused an intimate mixture of the two chemicals and secured the oxidation of the copperas (Figure III).

Complete oxidation of the copperas is the essential part of this process, and in the construction and operation of a plant using "chlorinated-copperas," care and special attention should be devoted to a design which will secure this result. During the operation of the plant, frequent tests should be made to determine that complete oxidation is being obtained. In the design of plants using this treatment the box in which the copperas and chlorine are mixed should be easily accessible for taking samples for the oxidation test. Samples were collected frequently from the chlorinating barrel discharge, and

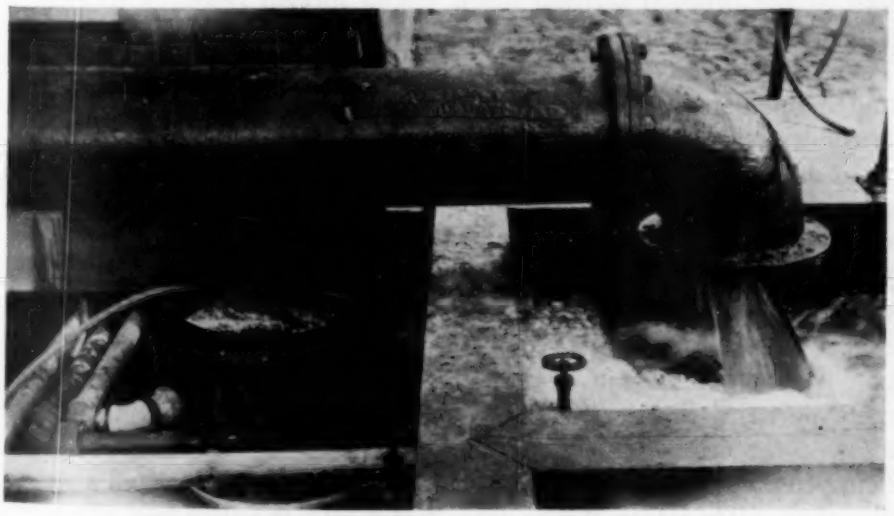

FIGURE III—Barrel in which Copperas is Chlorinated

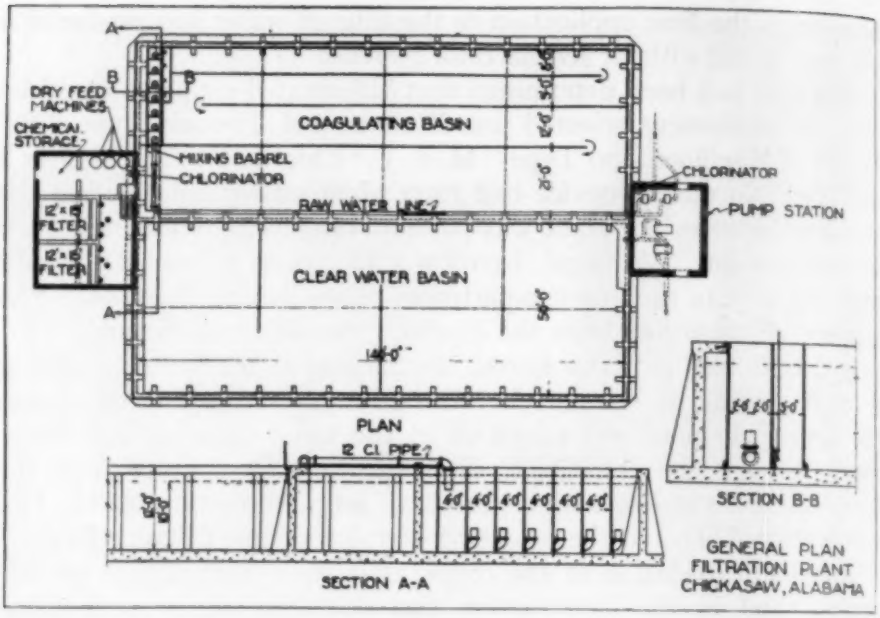

FIGURE IV

the test applied until there was assurance that the copperas-chlorine ratio was being properly maintained and no ferrous iron was being discharged. It is, as already pointed out, far preferable to operate on the side of safety and always have present some excess chlorine, than to err in the other direction.

The mixing chamber and coagulating basin were adjusted to one unit of the original settling basin. The mixing chamber consists of a series of vertical compartments through which the water passes. There were seven compartments, each 4 ft. square in plan and extending to full depth of the coagulating basin, 10 ft. The raw water is introduced over the top of the first of these compartments in a downward direction, leaving at the bottom through a 12 in., 90° bend, and a nipple 18 in. long, and working upward through the second compartment. Each succeeding compartment is piped in the same manner. Water is thus introduced into each compartment with an upward motion and must travel a distance theoretically equal to twice the depth of the compartment. Arrangements were made so that the water could leave the mixing device from any of the compartments, commencing with the fourth. This provided flexibility in operation and allowed the mixing period to be varied in accordance with the water being treated. The water from the mixing chamber entered a stilling chamber, after which it was introduced into the first bay of the coagulating basin, which was divided into four bays by three round-the-

end baffles. These baffles were set to produce theoretical velocities as follows:

First bay	1.165 ft. per minute
Second bay	1.035 ft. per minute
Third bay	0.778 ft. per minute
Fourth bay	0.445 ft. per minute

With this arrangement, it was hoped to effect a more even distribution of the sludge (Figures IV, V and VI).

Water was taken from the last bay by a 700-gal. per-min. Allis-Chalmers 750 r.p.m. centrifugal pump. The pumping of the coagulated water was made necessary to adjust new work to old, and on account of the topography and character of the soil. The filters were of concrete with perforated pipe collecting system. Each was of ½ million gal. per day capacity.

Water from the filter was discharged into the clear water basin through a 10-in. cast iron line. This clear well is the other half of the original plain sedimentation basin. The clear water well has been baffled with three transverse round-the-end baffles to secure, as nearly as possible, complete displacement and prevent dead water. The suction line of the high duty pump is at the opposite end of the basin from the filter effluent pipe. The chlorine is introduced into the suction pipe of the high duty pump.

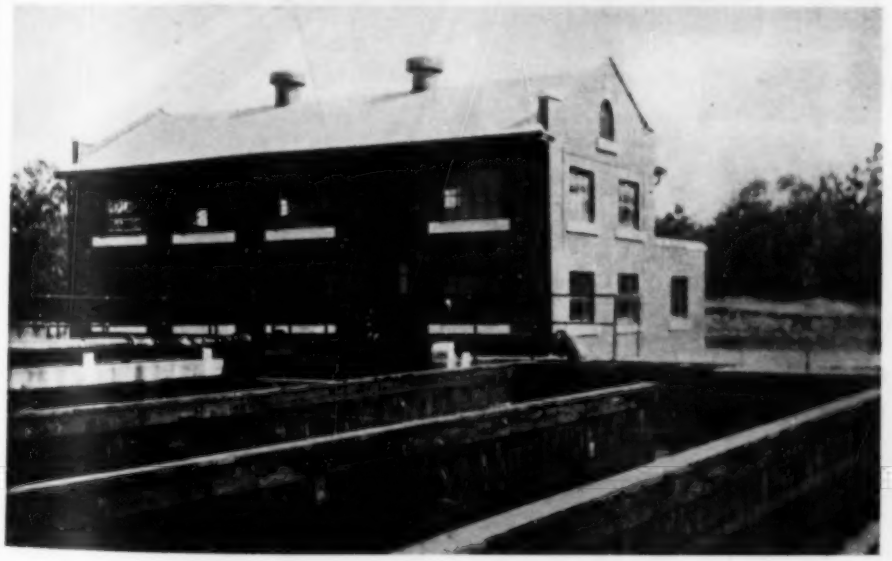

FIGURE V—Coagulating Basin and Filter Building

We would emphasize the fact that complete oxidation of the copperas is absolutely essential to the success of this method of coagulation and that a small excess of chlorine is desirable. An efficient mixing device for chlorinating the copperas should be provided. Substantially complete color removal can be accomplished on waters of the character of that being treated at the plant described, using 0.7 gr. per gal. of chlorinated-copperas. Correction can be made with lime to adjust the pH up to 7.2 without materially impairing the color. Increasing the pH value above 7.2 intensifies the residual color.

The process is efficient and economical without being unduly tedious. Continuously satisfactory results have been obtained during the 6 months that the plant has been in operation. The saving in cost of chemicals as compared with that of other processes tried was found to be very substantial—in our case amounting roughly to $10.00 per million gallons.

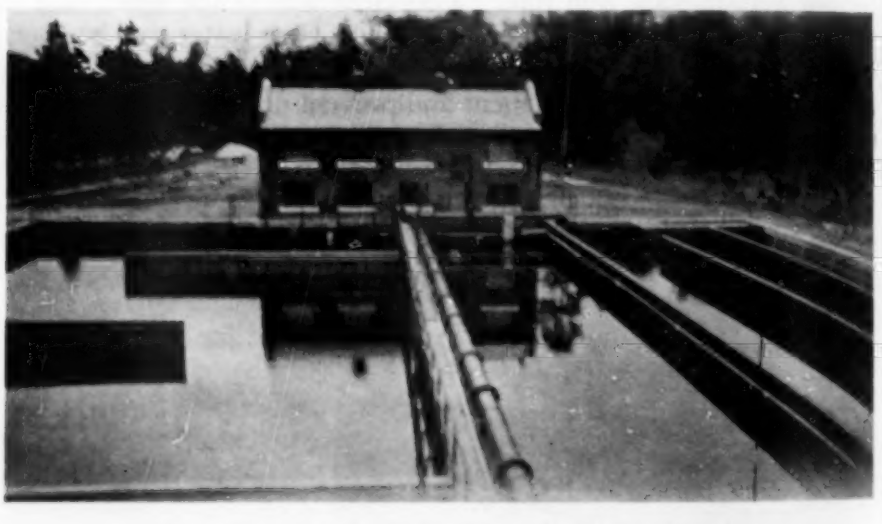

FIGURE VI—Coagulating Basin, Clear Well and Filter Building

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A Survey Schedule for Industrial Hygiene

THE Committee on Administrative Practice, from the beginning of its work, felt the need of including within the scope and detail of its local surveys information with respect to the industrial health service of communities. Some time ago a committee was appointed by the Chairman of the Committee on Administrative Practice, consisting of W. S. Rankin, M.D., Chairman, Prof. Leonard Greenburg, Secretary, V. S. Cheney, M.D., E. R. Hayhurst, M.D., A. J. Lanza, M.D., E. M. Price, F. L. Rector, M.D., W. A. Sawyer, M.D., and L. A. Shoudy, M.D. This committee was asked to recommend supplemental information to that called for on the regular survey schedule of the Committee on Administrative Practice, so that sound advice as to the industrial health services of communities might be provided for.

It was clearly understood that the sub-committee would not attempt to set up a system for evaluating or appraising the industrial hygiene service of a city, but would limit its work to the preparation of a schedule of information for obtaining additional and special information not included in the regular survey schedule of the committee. With this limitation, the sub-committee did not include much information of interest to those with special interest in the problems of industrial hygiene, because such information as, for example, provisions for the diagnosis and treatment of contagious diseases, venereal diseases, and tuberculosis, and provisions for various clinics, maternal, infant, dental, school, etc., is already provided for in the regular schedule.

Survey Schedule for Industrial Hygiene

1. Tabulation of Industries

(Include only organizations employing 25 people or more in cities under 50,000 and 50 or more in cities over 50,000.)

List Industries According to This Classification	Number of Employees					
	White		Colored		Total	
	M.	F.	M.	F.		
a. Industrial						
b. Commercial						
c. Mercantile						
d. Public Service						
e. Municipal						

Note: Append list showing name and nature of industries.

We would emphasize the fact that complete oxidation of the copperas is absolutely essential to the success of this method of coagulation and that a small excess of chlorine is desirable. An efficient mixing device for chlorinating the copperas should be provided. Substantially complete color removal can be accomplished on waters of the character of that being treated at the plant described, using 0.7 gr. per gal. of chlorinated-copperas. Correction can be made with lime to adjust the pH up to 7.2 without materially impairing the color. Increasing the pH value above 7.2 intensifies the residual color.

The process is efficient and economical without being unduly tedious. Continuously satisfactory results have been obtained during the 6 months that the plant has been in operation. The saving in cost of chemicals as compared with that of other processes tried was found to be very substantial—in our case amounting roughly to $10.00 per million gallons.

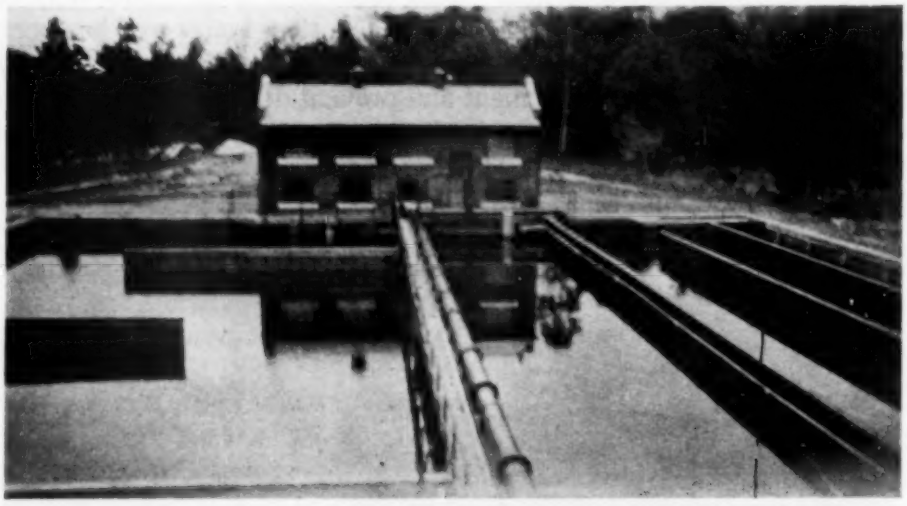

FIGURE VI—Coagulating Basin, Clear Well and Filter Building

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A Survey Schedule for Industrial Hygiene

THE Committee on Administrative Practice, from the beginning of its work, felt the need of including within the scope and detail of its local surveys information with respect to the industrial health service of communities. Some time ago a committee was appointed by the Chairman of the Committee on Administrative Practice, consisting of W. S. Rankin, M.D., Chairman, Prof. Leonard Greenburg, Secretary, V. S. Cheney, M.D., E. R. Hayhurst, M.D., A. J. Lanza, M.D., E. M. Price, F. L. Rector, M.D., W. A. Sawyer, M.D., and L. A. Shoudy, M.D. This committee was asked to recommend supplemental information to that called for on the regular survey schedule of the Committee on Administrative Practice, so that sound advice as to the industrial health services of communities might be provided for.

It was clearly understood that the sub-committee would not attempt to set up a system for evaluating or appraising the industrial hygiene service of a city, but would limit its work to the preparation of a schedule of information for obtaining additional and special information not included in the regular survey schedule of the committee. With this limitation, the sub-committee did not include much information of interest to those with special interest in the problems of industrial hygiene, because such information as, for example, provisions for the diagnosis and treatment of contagious diseases, venereal diseases, and tuberculosis, and provisions for various clinics, maternal, infant, dental, school, etc., is already provided for in the regular schedule.

Survey Schedule for Industrial Hygiene

1. Tabulation of Industries

(Include only organizations employing 25 people or more in cities under 50,000 and 50 or more in cities over 50,000.)

List Industries According to This Classification	Number of Employees					
	White		Colored		Total	
	M.	F.	M.	F.		
a. Industrial						
b. Commercial						
c. Mercantile						
d. Public Service						
e. Municipal						

Note: Append list showing name and nature of industries.

2. Health Service Carried on by Industries

Name of Firms	No. of Full-Time Physicians	No. of Part-Time Physicians	No. of Full-Time Nurses	Physical* Examination on entrance required	Periodic* Physical Exam. required	Health* Educational Activities carried on	First Aid Facilities

* Check each column if activity is maintained.

3. Services for Municipal Employees

(Check the following service carried on by the municipality to conserve the health of its own employees.)

Physical examinations .....
Vaccinations .....
Medical treatment .....
Hospitalization .....
Sick relief .....
Health instruction .....

(Append description of outstanding services)

4. Dispensary and Hospital Facilities in City

(This item to be obtained only when hospital survey is not being made)

Name of Institution	Dispensary		No. Hospital Beds	Beds per 1,000 Pop.	Per Cent Occupancy	No. Hospital Days			
	Number					Free	Part Pay	Full Pay	Total
	Cases	Visits							

5. Occupational Hazards and Diseases

a. Specify any occupational diseases and number of cases reported from this community last year:

Diseases	*No. Cases*
.....	.....
.....	.....
.....	.....
.....	.....

6. Health Supervision of Industries

a. Does the state health department take any cognizance of industrial hygiene? ..... In what manner? .....
.....

b. Does the municipal health department or other municipal agency take any cognizance of industrial hygiene? ..... In what manner? .....

c. Does the municipal health department utilize industrial approach in carrying out preventive or educational measures? .....
.....
If so, how? .....

7. Legislation Affecting Health in Industries

a. What occupational diseases are included in state compensation law? (List) .....
.....
(Attach copy of law)

b. Attach copy of laws regulating employment of women and children

NOTE: The above schedule has been approved by the Committee on Administrative Practice of the American Public Health Association for use in collecting additional information to that called for in the *Appraisal Form for City Health Work* (3d ed.), 1929.

Delta Omega Publication

A 20-page pamphlet giving the list of members of Delta Omega, with their present addresses and their academic degrees, has been issued. This honorary public health society was organized in 1924 at the Johns Hopkins School of Hygiene and Public Health and now has 6 chapters and 250 members.

It is interesting to note that the most popular degree represented among the members of the society is the doctorate of public health (Dr.P.H.), which is held by 69 persons. Twenty of the medical graduates have obtained certificates in public health (C.P.H.) without other public health degrees, while 5 have taken the doctorate of science in hygiene (Sc.D.).

Among the 129 non-medical sanitarians, the doctorate in science has been the most popular, as there are 30 such degrees. Doctors of philosophy are also numerous, 26 being listed, though mostly among faculty members. Fifty-seven of the 250 members are listed as holding only bachelor or master degrees, or certificates in public health. Many of these are, however, candidates for various doctorates, though a considerable number are already actively engaged in public health work.

In tabulating the occupations of the members of the society it is significant that the largest proportion are teachers, though of course many are connected with the faculties of the institutions having chapters. About 30 are with other universities. State health departments claim 24, and local health work only 14, according to the available records. Another 25 are associated with voluntary health agencies. Only 31 of the total of 250 members are listed as being outside of the United States. These figures give an interesting indication of the type of training of present-day sanitarians and their field of activity.

Effect of Dust on the Lungs*

JUDGING from the number of investigations carried out during the past few years on the incidence and physiological effects of dust on persons employed in various industries, consideration of the hazard is assuming more and more importance in the minds of those concerned with public health.

The present report deals principally with the incidence of silicosis and does not take into account other health hazards that may be present in the dusty trades.

OCCURRENCE OF SILICOSIS

This disease, which is distributed in all parts of the world, is found in many industries, such as metal mining, the quarrying and dressing of granite, sandstone, millstone, and flint, the refractory industry, and in sandblasting.

In an investigation into the health and working conditions of employees in the mining industry of Australia carried out in 1928,[1] it was found that silicosis and tuberculosis, either singly or combined, exist as industrial diseases among the employees of the mining industry in Tasmania, as well as in Victoria. Gold mining in Victorian mines is a much more potent cause of industrial pulmonary disease than work in the Tasmanian copper, silver-lead, and tin mines.

Recently in a report on "The Present Position of Silicosis in Britain," *The Lancet*[2] quoted statements by Dr. Middleton, the medical inspector of factories, calling attention to the occurrence of the disease in various industries throughout the country.

According to Dr. Middleton the sandstone industry represents the most widespread of all silicosis producing industries, but the incidence of the disease is diminishing owing to the application of water and mechanical methods of dust suppression. The granite industry, although allied to sandstone quarrying and dressing, is complicated because of the varying proportions of quartz, feldspar, and mica present in the rock. As the result of an inquiry into the slate industry there appears to be some evidence of the production of fibrosis of the lungs, but the occurrence of actual disability within the ordinary working lifetime of workers is not clearly shown.

In the grinding of metals, silicosis, and especially the combined disease of silicosis with tuberculosis, was at one time extremely prevalent, but the sandstone wheel is being largely replaced by wheels of abrasives such as carborundum. Allied to the grinding of metals is the process of sand blasting metals and etching

* Report of the Committee on Silicosis presented to the Industrial Hygiene Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.

glass, by playing a jet of sand under high pressure against a metal or glass surface to produce certain effects. The process is becoming more extensively used, and it is a matter for serious consideration whether a substitute such as iron or steel grit could not be used to replace the siliceous grit as the abrading material. In pottery manufacture, both in the manufacture of earthenware and of china, Dr. Middleton suggested that " potter's asthma " is due to dust containing ground flint. Ground silica is used in many industries, and, in the crushing and grinding of the silica and in the industries in which ground silica is used, silicosis, sometimes of an acute type, occurs. The evolution of dust in these industries is controlled by the use of mechanical methods of handling, enclosure of machinery, and the use of localized exhaust draught.

Tin mining in Cornwall has had a high mortality rate from tuberculosis, and it has been shown that this is associated with silicosis. Drilling of the highly siliceous rock in which the tin ore occurs is now done through hollow steel with a water feed. Silicosis also occurs in coal miners employed on hard headings.

The report also states that the ganister and silica bricks manufactured in the refractories industry contain over 90 per cent of silica and that a medical board composed of specialists periodically examines each of the 2,000 or 3,000 persons employed in this industry.

According to Stewart[3] in districts of Lancashire County, England, where the industry of coal mining predominates (40 per cent of the occupied males being engaged in mining), the male death rate from pulmonary tuberculosis is higher than the corresponding rate for the whole administrative county. Since the death rate from pulmonary tuberculosis among all coal miners of England and Wales is below that for the general population, the statistical evidence suggests strongly that there is in Lancashire an occupational factor at work that raises the death rate among miners, and that this factor is silicosis.

An inquiry was made by Sutherland and Bryson[4] to obtain evidence regarding the occurrence of silicosis among workers in England manipulating sandstone in connection with the granting of compensation to sandstone workers since February 1, 1929, under the Workmen's Compensation Act of 1925. The findings disclosed that 1 out of every 4 men at work appeared to be the subject of " mason's disease." Since the men were all examined at work, any case so far advanced as third stage, and also many in the second stage, would not be found at work.

In an investigation of health conditions in a sandstone paving stone quarry, which had been in operation near Paris for 50 years, it was found[5] by a study of mortality records that for the period 1881 to 1926 all the deaths occurring among the workers were attributed to respiratory diseases.

In Germany, according to Teleky,[6] in spite of outstanding improvement in conditions, the mortality from tuberculosis is very high among metal polishers—higher than among similar mining groups. He considers sandstone to be the most dangerous grinding stone and recommends the substitution of artificial stone and the introduction of other protective measures such as dust removal, reduction of working time, separate rooms for polishing, and medical supervision.

At the suggestion of the county industrial physician, the Tuberculosis Hospital at Schwetzingen[7] examined 23 of the men engaged in sandblasting in a metal polishing plant after it had been observed that several of the workers were affected by lung diseases. Of the sandblasters examined all except 2 complained of troubles. This report emphasizes the finding that the pneumonoconiosis caused by sand dust

is more dangerous than anthracosis. The time of activity of these men in this industry was comparatively short; in most of the cases there was a pronounced roentgenological finding and in some changes of great severity and extent were observed.

An X-ray and clinical examination of 282 workers, who had been employed for 15 years or more in the most dust producing operations of a porcelain factory in the vicinity of Moscow, Russia,[8] showed an unexpectedly low percentage of pneumonoconiosis. This was the more surprising as porcelain dust contains large amounts of SiO_2. Of the 282 workers examined, 24.1 per cent showed suspicious indications of pneumonoconiosis and 13.5 were definitely affected by the disease.

At the meeting of the Permanent International Commission for the Study of Industrial Diseases, which was held in Lyon, France, April 3–6, 1929,[9] Dr. Irvine in his paper, "Diagnosis of Silicosis as an Occupational Disease," gave the following figures regarding the incidence of silicosis among European miners on the Witwatersrand:

> During the past 11 years, 4,092 cases of "simple silicosis," 377 "tuberculosis with silicosis," and 365 cases of "simple tuberculosis" have been detected by the Medical Bureau among the working miners on the Witwatersrand. Reduced to average figures these numbers represent in the case of "simple silicosis" alone an annual "production" of 372 cases among a population of 13,436 working miners; so that the average annual rate of incidence for the whole period was 2.76 per cent.

So far, reported studies of silicosis have been made for the most part on industrial groups in which the existence of silicosis as a hazard was deducible *a priori*. In the Industrial Department of the Vanderbilt Clinic, the occasional worker who appeared, giving a history of rock drilling in subway or tunnel construction work in New York City only, and who showed on X-ray examination of his lungs well-marked evidence of silicosis, aroused speculation as to the extent to which silicosis develops under conditions of excavation and tunnel construction in this city.

Of 208 men engaged in occupations exposing them to rockdust in Manhattan, who were selected for complete study, 57 per cent showed the presence of silicosis: 23 per cent showed radiographic evidence of ante-primary silicosis; 19 per cent of first stage silicosis; 7 per cent of second stage silicosis; and 8 per cent of third stage silicosis.[10]

In a study made of the abrasive industry, Clark[11] found that of a total of 137 workers exposed to large doses of dust, mostly from abrasives, over periods varying from 10 to 42 years, 42 showed no silicosis, 12 showed slight silicotic change, 77 the picture of first stage, and 6 the picture of second stage silicosis. Of the 6, 2 had been exposed to large doses of clay dust containing 9 per cent of free silica, 4 had been exposed to abrasive dust only. There were 11 cases in which the X-ray showed an old inactive tuberculosis process in the lung.

AGE INCIDENCE AND INFLUENCE OF LENGTH OF EMPLOYMENT IN THE DUSTY TRADES

Inquiry into the age incidence of industrial pumonary disease among miners examined in Australia[4] shows that, while pulmonary tuberculosis may occur in early life, silicosis is a disease of slow evolution and does not appear frequently under the age of 40, and a period of at least 10 years in the industry is necessary to produce it. However, reports on other industries, such as sandblasting and the

pottery industry, would indicate that under some conditions the disease appears earlier. In the pottery industry in England[12] it has been found that in occupations where the occurrence of silicosis is high the disease becomes evident at an early stage in the occupational history of the worker. Sutherland and Bryson state[4] that where the risk is present in the sandstone industry, the disease is much more common after 40 years of age and after 20 years of work in the industry.

According to Mavrogordato,[13] on the Witwatersrand, among miners who develop silicosis, the mean duration of exposure before the disease is clinically recognized is from 10 to 11 years, whereas in the British pottery industry it appears to be about 25 years. He states, however, that although dust is easier to control in a pottery than in a mine, the potters start work much younger than do the Witwatersrand miners and continue in the occupation much longer. Nevertheless the actual annual silicosis rate of the potters appears to be about the same as that of the miners.

In the sandblasting industry, Müller[7] found more severe pneumocotic lung changes with proportionately shorter activity not only among older workers but also among the younger ones, although X-ray examination revealed more severe changes in the older people than in the younger when the time of activity in the industry was the same. Thus, the average age of the workers, examined by Müller, who had more severe lung changes, was 45 years, while the average age of the other workers was 32.6. The time of activity in the industry was with all comparatively short—with one worker 8 years, with one 6 years, and with all the rest under 3 years.

In the porcelain industry, according to Kaestle,[14] workers hardly ever show characteristic pneumonoconiosis under 10 years of work; but in the case of older workers with relatively short working time he found the changes to be clearer and more stubborn than in younger employees of similar working time. He considers that the vitality of the whole man and of the respiratory system plays an essential rôle in the prevention of damage and the self-purification of the intruded dust. He also recommends that only those who have reached a certain bodily maturity be employed in this occupation, since the self-purifying ability of the lungs is greater if the worker is not very young or very old.

In the investigation in New York City[10] it was found that 76 men, or 36.5 per cent, had been exposed less than 10 years, while 132, or 63.5 per cent, had been exposed 10 years or more. The shortest exposure in the entire group was 6 weeks; in the ante-primary group it was 3 years; in the first stage group it was 1 year, and in the second and third stage groups it was 9 years. The longest exposure in the entire group was 46 years. In the ante-primary group it was 40 years; in the first stage group, 46 years, and in the second and third stage groups, 44 years.

According to Hamilton,[15] in the enamel-ware industry, in spite of the improvements that have taken place, it is a significant fact that the working life of an enameler is still short, although his wages are good and his hours often less than the average. One large plant points with pride to a veteran who has worked at the trade for 22 years; another has one with 18 years of service. Since the men start in at 18 or 20 years of age, it is plain that the great majority must give it up before they reach the age of 40 years.

From June, 1927, to December 31, 1928, there were made 15,351 physical examinations of men and 400 of women and children at the U. S. Bureau of Mines Health Clinic, Picher, Okla. This year's work so far indicates that there has been

a reduction in the number of silicotics working in the mines in this district. Much of this reduction is due to the silicotics leaving the mines. A great many of these men have either been given suitable treatment in hospitals, sanatoriums, etc., or have been provided with suitable work outside of the mines.

An investigation, begun in 1926, and reported recently,[16] was made by Hayhurst and his coworkers, in one of the largest and deepest sandstone districts in the world, located in Ohio and worked for more than 50 years. The workmen are employed by two quarry companies which market grindstones, scythestones, curbing, flagging, breakwater and building stone, and also furnace sand. The report summarizes the results as follows:

> A stereoscopic X-ray examination was made of each of the 919 workmen, of which number the films of 913 workmen were readable. Of this latter number, pulmonary pathology was found in 55.1 per cent, including 38.5 with silicosis in various stages. The total tuberculosis, however, was but 1.9 per cent. Likewise general disability was low. These findings check relatively closely with those of the tuberculosis statistics for the community. The period for developing silicosis, namely, 16.24 years, is over twice that reported elsewhere. The rock has an average content of from 92.15 to 97 per cent crystalline silica (SiO_2).
>
> A study of silicosis reports throughout the world indicates that tuberculosis is usually present in from 20 to 30 per cent or more of the cases of silicosis, but of our 260 men with silicosis only 13, or 5 per cent, had tuberculosis.

The authors suggest that other silicosis studies at this quarry should include a careful analysis of the rock itself, from both chemical and petrographic points of view.

A few years ago, the U. S. Public Health Service[17] began a series of intensive studies on the health of workers in dusty trades. The first study was reported in 1928, and dealt with the health of workers in a cement plant. The report on the second study,[18] dealing with the health of workers exposed to silica dust in the granite-cutting industry, has recently been published.

This report brings out clearly the extent of the hazard under such conditions as existed in the plants studied. Of particular importance is the fact that it was possible, by differentiating occupations on the basis of the amount of dust exposure, to determine within broad limits how much dust of the composition studied can be tolerated by workers without serious deleterious effects. The conclusion was reached that a maximum of dust exposure falling somewhere between 10 and 20 million particles per cu. ft. of air is a desirable limit for dust containing about 35 per cent free silica in the form of quartz. It was also concluded, on the basis of a study made in other plants having local exhaust ventilation systems, that this limit could be reached by the use of economically practicable ventilating devices of this character. The recommendation was made that occupational processes in which little dust is produced be segregated in separate rooms or buildings.

It should be pointed out that the limit established was not found to prevent the occurrence of silicosis. It was found, however, that there seemed to be no particular liability to pulmonary tuberculosis where the concentration of dust was within this limit.

The study was of such a character as to present a rather definite picture of what happens to men working for many years under a dust hazard of the extent described. The salient points may be summarized as follows:

1. The long period of service before the liability to tuberculosis becomes manifest (generally 20 years or more)

2. The sharp correlation between length of exposure to the dust and the prevalence of tuberculosis and also the death rate from this disease

3. The close relation between the extent of dust exposure and the health of the men

4. The universal occurrence of silicosis among the workers

5. The large proportion of workers finally succumbing to tuberculosis

6. The almost invariably fatal form of the disease within a short time after the onset

7. The different character of silicosis as manifested by X-rays compared with that shown where there is exposure to a dust with a much higher content of free silica

8. The location of the tuberculosis lesion, usually basal, where the disease complicates silicosis

9. The absence of deaths from silicosis *per se*, tuberculosis apparently always intervening

10. The failure of workers to recover from their condition upon going into non-dusty trades

11. The high incidence of sickness of a severe nature from causes other than tuberculosis

12. The rising sickness and mortality rates from tuberculosis due to longer use of the hand-pneumatic tool

13. The high death rates at the present time from tuberculosis, compared with normal industrial experience

ETIOLOGY OF SILICOSIS

Miners who have silicosis, according to Tattersall,[2] will be found without exception to have been engaged principally in drilling or hewing stone. The abnormal appearances in the lungs of the gold miner, the stone mason, the quarryman, and the coal miner are similar although the constituents of the dust may vary, indicating that the silica and that alone gives rise to the pathological condition.

According to a paper by Heffernan[2] on the biophysics of silica and the etiology of silicosis, the disease is the result of the local action of hydrated silica upon the pulmonary tissue; this action is physico-chemical in nature and its development depends upon the rapidity with which fresh silica hydrosol is brought into contact with pulmonary tissues; substances, such as alkalis, which favor the formation of silica hydrosol from silica, when added to silica dust accelerate the development of the silicosis; and substances, such as carbon, coal dust or clays, which retard or prevent the formation of hydrosol from silica or which coagulate the hydrosol when formed, retard or prevent silicosis.

In Australia some evidence was noted that silicosis complicated by tuberculosis may occur earlier than uncomplicated silicosis.

Stewart[2] calls attention to the fact that the precise manner in which the silica acts upon the lung tissue and renders that soil favorable for the development of tuberculosis is still a matter of controversy, one view being that the silica acts as a soluble protoplasmic poison, the other view being that colloidal silica is formed which acts in an adsorbent way on the protoplasm of the cells containing the silica, forming a pabulum which is a favorable soil for the growth of tubercle bacilli.

Stewart considers that there is no doubt that when silicosis and tuberculosis are both present, tubercle bacilli are often extremely difficult to obtain; that such a case may proceed to a fatal termination without tubercle bacilli being found, and yet extensive tuberculosis be found post-mortem in addition to the silicosis. According to him, the question of the infectivity of these combined cases of tuberculosis and silicosis is an interesting one. There is a good deal of evidence available pointing to low infectivity as compared with cases of simple pulmonary tuberculosis. The evidence in his own dispensary area (southeast Lancashire) tends to confirm this view, as the number of positive contacts from such cases has been few compared with contacts from patients with simple pulmonary tuberculosis.

Stewart also called attention to the point of controversy as to the priority of the two conditions, whether the silicosis is antecedent to the tuberculosis or *vice versa*. Dr. Watkins-Pitchford in South Africa thinks that the great majority of cases of simple silicosis would not have developed into such but for the presence of a tuberculous element in the lungs. According to Stewart, clinical evidence neither proves nor disproves this view.

In France a histochemical study was made of lungs taken from subjects having lived in the city and never having worked in coal mines[19] and in another study by the same investigators[20] a cytological and histochemical examination was made of the lungs showing 4 typical cases of anthracosis in miners in Courriere. According to these investigators these studies have enabled them to contribute some new results in regard to the much discussed problem of the nature of anthracosis pigment, whether the ferruginous pigment found is derived from blood or from masses of exogenous particles of coal introduced by respiration.

From these studies the following conclusions were drawn: A small part of the pigment encountered in the anthracosis of miners is certainly formed by a substance derived from hemoglobin, yielding red ashes of iron oxide. The other part, by far the more important, is formed by a pigment which disappears by incineration without leaving any residue of iron oxide. This pigment, which is extremely abundant, can be considered either as a non-ferruginous endogenous pigment or as from coal. The authors think that the latter interpretation is correct for the two following reasons: The particles of this pigment are extremely irregular and non-spherical, as those of an endogenous pigment. They coexist always with other particles of a mineral nature, which on incineration leave an abundant residue of calcarious and silicious ashes. This constant existence of silicious minerals and black pigment indicates that this latter is coal. The coal dust is fixed in the lungs exactly as the silicious dust.

According to Mavrogordato, pigmentation facilitates the tracking of dust by the naked eye, but is not an essential part of the changes produced by dust of free silica. If silica particles be injected intravenously, some pigmentation is to be observed on intracellular particles and this pigment is probably a hemoglobin derivative. He considers the point to be rather of interest than importance, as far as silica itself is concerned, and calls attention to the fact that Virchow, until Zenker convinced him to the contrary, regarded pigmentation in dust-phthisis as due to a breakdown of hemoglobin, and not to the dust inhaled. When one turns to the metallic dusts—cobalt, iron or vermilion, for instance—one is reminded of the work of Mallory and others on hemochromatosis and feels that, in these cases, the part played by the breakdown of hemoglobin may be more significant. The presence of carbon in the air does not appear to effect the changes produced by silica other than by coloring them, and the tissue changes, detailed above, according to

Mavrogordato, can be produced by silica alone, and a silicotic lung need show very little pigmentation.

Mavrogordato summarizes[12] the current views on the etiology of silicosis under two headings: 1. Cases of uncomplicated silicosis, in which no infective element is present; and 2. Cases of silicosis complicated by infective processes, of which the most common is tuberculosis. He asserts that certain industries are "phthisis producing" and defines such a dust under four headings as follows: (a) Its nature, (b) size of particles, (c) faculty of being arrested in the tissues, and (d) concentration of dust, duration of exposure and conditions of exposure.

According to him, a phthisis producing dust arrested in the lungs in sufficient quantity will set up a fibrosis, but will not produce a true "miners' phthisis." The effective occupation of the lungs by a phthisis producing dust facilitates infection by the tubercle bacillus, and may influence the result of infection by certain other organisms. Clinical silicosis and fibrosis in the presence of a phthisis producing dust implies arrest of dust in the lungs. The lungs may, however, be effectively occupied by dust clinically undemonstrable yet capable of influencing an after-coming infection. The disabling and fatal form of miners' phthisis, as now met with on the Witwatersrand, he considers is due to an infection by the tubercle bacillus superimposed upon lungs effectively occupied by a phthisis-producing dust. This event may or may not be preceded by a definite clinical silicosis. Delayed resolution and chronic progressive changes may occur in lungs effectively occupied by a phthisis producing dust after recovery from acute pneumococcal or streptococcal infections.

PHYSIOLOGICAL ASPECTS

There is not much new material along the lines of symptoms, diagnosis, treatment and prevention, efforts of investigators apparently having been devoted mostly to the determination of the presence of the disease in various industries.

Irvine[8] stressed the importance of the infective factor in silicosis and emphasized the fact that it is uncommon to find a condition of clinically obvious tuberculosis present at the stage at which silicosis first becomes detectable. The very great majority of cases of silicosis found among working miners, when first detected, are from the clinical standpoint cases of uncomplicated or "simple" silicosis, without evidence of obvious or "overt" tuberculosis. Nevertheless, "simple" silicosis should not be thought of merely as a dust fibrosis, but as being at least in a majority of cases a dust fibrosis which from its beginning as a clinically detectable condition is linked up with an element of latent tuberculous infection. The after-history of these cases is in this respect significant. In the majority of instances silicosis is a progressive disease. The outlook of the individual case is mainly dependent upon whether the infective element remains "bottled up" and inactive, or whether, on the other hand, it becomes active, or a further infection occurs from outside the lung. In some instances advance is rapid; in others, again, the condition may remain stationary practically indefinitely. But, although there are wide individual differences, dependent no doubt in part upon constitutional, nutritional and environmental factors, yet the tendency of the majority of cases to advance is, on the average, singularly uniform, and the culmination of that advance, if it proceed to its terminal stage, is in a form of obvious active tuberculosis in the silicotic lung, although by no means all cases advance to that condition.

There is some disagreement in regard to the suggested treatment by the administration of some non-silicious dust, such as coal dust, that is apparently harmless and will assist in removing the harmful dust from the lungs.

Dr. Middleton states that it would appear that once enough silica has been inhaled to produce the nucleus of fibrosis, the resulting inhalation of coal dust into a lung in which the lymphatic drainage has been disorganized increases the fibrosis and produces disability.

Kaestle considers that even with the conviction that dust and bacilli can be forced into the respiratory organs in various similar ways, the attempt of such inhalation therapy is driving out the devil with Beelzebub, a very problematical healing of tuberculosis purchased by the certainty of dust lungs.

Mavrogordato states that, according to experimental studies, a phthisis producing dust and an infective agent simultaneously present facilitate each other's action in the direction of producing fibrous tissue. No experimental evidence could be secured suggesting that the presence of coal dust in the lungs exercised a protective action against tuberculosis. The simultaneous inhalation of coal dust and silica dust facilitates the exit of silica laden cells from the lungs, but a lung previously invaded by coal dust has no special ability to rid itself of silica. As already mentioned, a lung invaded by silica retains the fine soot from acetylene lamps.

Müller[7] points out the injustice of not recognizing as occupational the diseases of sandblasters, resulting from their employment, as lead poisoning is in the case of lead workers. However, in England this is done under a scheme of the Workmen's Compensation Act of 1925. In February, 1929, a new scheme became effective known as the Sandstone Industry (Silicosis) Scheme.[4] Some of the provisions of the scheme are that a register, supplied by the employer, must be kept by the worker and produced when required by the employer or the Medical Board, on which shall be entered date of commencement of his employment with employer, particulars of any previous employment in the sandstone industry or in any of the occupations mentioned in the First Schedule to this Scheme, and date of medical examination entered by the Medical Officer making the examination. The workman will be liable to forfeit his right to compensation if he fails to furnish true information or carry out other specified duties under this scheme. In case of a workman employed in the industry on or after April 1, 1929, or in case of death, his dependants will be entitled to compensation, if his death or disability is caused by silicosis. The disease must be due to employment in the industry, and will be so considered if the workman has been employed for a period or periods amounting to not less than 5 years, unless the employer or the company proves the contrary.

If the employer fails to carry out any of his duties he will be liable to pay an increased subscription to the Compensation Fund. The Scheme requires the employers to furnish facilities for the periodic medical examination made at the works and not, without the consent in writing of the Medical Board, to engage or to continue to employ in the sandstone industry any workman who has been suspended under the Scheme or who has refused to submit himself to any examination required under the Scheme. If the workman refuses or wilfully neglects to submit himself to any such examination or in any way obstructs the same, or if after having been suspended he without consent in writing of the Medical Board reëngages in the sandstone industry, he will be liable to forfeit his right to compensation.

All investigators agree that efficient methods of removing or allaying dust, ex-

amination of men before beginning work in the dusty trades and periodically thereafter with the elimination of the tuberculous, are of value in the prevention of silicosis. Although the rule holds that once silica invaded always silica occupied, the lungs have considerable powers of ridding themselves of silica laden cells. This is borne out by observations made on South African native miners[12] who, for the most part, work short contracts interspersed with visits to the kraals and it is surprising how comparatively little naked-eye pigmentation there may be in the lungs of a man who had worked several underground contracts and has afforded opportunities for observation owing to his death from an accident immediately on resuming work after an interval.

According to Mavrogordato, this indicates that intermittent, as opposed to continuous, employment is perhaps the most effective single measure against silicosis. He states that the simple silicosis rate among native miners employed on the Witwatersrand is lower than that among white miners, although the native, when at work, is more exposed to dust than is the white miner. His employment, however, is intermittent as compared with the continuous employment of the white man. A study of a small group of natives who had been employed continuously showed about the same simple-silicosis rate as obtained among white miners; in fact, the mean duration of exposure before disease was recognized in the continuously employed native was less than that in the case of the white man.

SUMMARY

Consideration of the dust hazard in industry, if judged by the reports appearing during the last year, is assuming more and more importance from the standpoint of public health.

The sandstone industry, according to reports, represents the most widespread of all silicosis producing industries. Investigation of this industry in England in connection with the Workmen's Compensation Act showed that 1 of every 4 men at work appeared to be the subject of "mason's disease." Silicosis is found among the metal polishers, metal miners, sandblasters, potters, and any other workers exposed to dust containing free silica. There is a difference of opinion as to free silica being the only causative factor as in New South Wales silicosis has also been found to be caused by orthoclase basalt, which does not contain free silica.

Silicosis may be classed under two headings: uncomplicated silicosis, in which no infective element is present; and silicosis complicated by infective processes, of which the most common is tuberculosis.

Histochemical and cytological studies made on the lungs of miners showing anthracosis and on those of non-miners indicate that the ferruginous pigment found in the lungs of both miners and non-miners is derived from the blood and not from exogenous substances inhaled by them.

Studies made by the U. S. Public Health Service in the granite industry show the close relation between the extent of dust exposure

and the health of the workers. The occurrence of silicosis is universal among them and a large proportion finally succumbs to tuberculosis, death apparently not taking place from silicosis *per se* without the intervention of tuberculosis. The death rate from tuberculosis is high in this industry when compared with normal industrial experience.

South African investigators think that "simple silicosis" should be considered in a majority of cases as a dust fibrosis linked up, from its beginning as a clinically detectable condition, with an element of latent tuberculosis.

A number of authorities stress the progressive character of silicosis since, although there are wide individual differences dependent no doubt in part upon constitutional, nutritional, and environmental factors, the tendency of the majority of cases to advance is singularly uniform and the culmination, if it proceeds to its terminal stage, is in the form of obvious active tuberculosis in the silicotic lung.

There is a difference of opinion in regard to the suggested treatment by the administration of a non-silicious dust, such as coal dust. Middleton thinks that once enough silica has been inhaled to produce the nucleus of fibrosis, the resulting inhalation of coal dust into a lung in which the lymphatic drainage has been disorganized increases the fibrosis and produces disability. Mavrogordato has been unable to secure experimental evidence indicating that the presence of coal dust in the lungs exercises a protective action against tuberculosis but thinks that the simultaneous inhalation of coal dust and silica facilitates the exit of silica laden cells from the lungs, although a lung previously invaded by coal dust has no especial ability to rid itself of silica.

All investigators agree that efficient methods of removing or allaying dust, examination of men before beginning work in the dusty trades and periodically thereafter with the elimination of the tuberculous, are of value in the prevention of silicosis. Although the rule holds that once silica invaded always silica occupied, the lungs have considerable powers of ridding themselves of silica laden cells. According to Mavrogordato this is borne out by observations made on South African native miners who, for the most part, work short contracts interspersed with visits to the kraals and he was surprised how comparatively little naked-eye pigmentation might be in the lungs of a man who had worked several underground contracts and had afforded opportunities for observation owing to his death from an accident immediately on resuming work after an interval.

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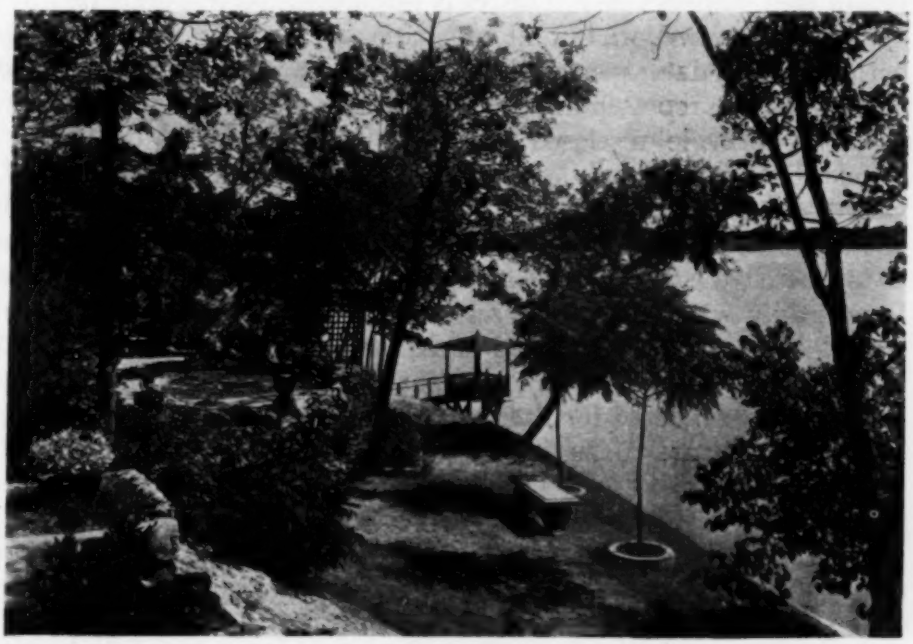

Camp on Lake Worth, Texas

Organization of Local Health Area Statistics in New York City*

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IN a great city like New York, with a population of 6 million swollen to more than 8 during the day by workers and visitors, and spread over an area of 309 square miles, in what direction and among whom is public health work going to be directed economically and effectively? Where are new hospitals needed, new health centers or clinics to be established?

For the systematic and continuous consideration of local health needs, the Department of Health, the Welfare Council, the Milbank Memorial Fund, and the New York Tuberculosis and Health Association have coöperated in developing a plan for the organization of local health area statistics in 270 districts throughout New York City.

Not only New York but all large cities are badly in need of neighborhood health data; general death rates are too often only theoretical mid-points not representative of many sections. Special studies in Bellevue-Yorkville[1] disclosed that in certain sections the death rate, standardized for age and sex, and based upon data for a 5-year period, varied from 12.3 per 1,000 to 24.2 when the district rate averaged 17.0, and that of the entire city was only 12.5. Without definite knowledge as to where "the dark areas" are, public or private health work is too frequently a wasteful barrage instead of a direct, economic and successful attack. Clearly defined health area units must be recognized in large cities; and standard, comparable vital statistics should be continuously available for each. The steps taken to secure this for New York City are the subject of this address.

HISTORICAL

For years, there had been available certain population data and very limited mortality statistics by wards or by political boundaries.

* Abstract from paper read before the Vital Statistics Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

As time went on these units became most unequal in population; thus, in 1920 the Second Ward in Manhattan showed a census of only 372 and the Twelfth Ward of 951,904. Federal or state censuses naturally publish their returns along frequently changed political boundaries. It therefore became practically impossible to maintain useful local vital statistics along these lines.

In 1906 the U. S. Bureau of the Census greatly assisted in making possible a remedy for the situation. The federal authorities adopted the plan of the New York Federation of Churches "for a scientific permanent basis for neighborhood tabulation of the population of New York City." Enumeration districts—approximately 40 acres each in the populous sections, and multiples thereof in neighborhoods sparsely settled—were laid out and have been followed for each of the last two federal censuses. Since 1910, thanks to the special tabulations by the Population Research Bureau of the Federation of Churches, and its successor the Cities Census Committee,[8] all the usual population data have been made available for these units. In 1914 the Department of Health recognized the census tracts as "sanitary areas" to be followed in constructing new administrative districts in tuberculosis clinic work, baby health station districts, etc.

But even with this progress, certain difficulties and needs remained as regards neighborhood health data: (a) The population in the uniform 40-acre tracts had been found to vary widely, and at times to be quite insufficient for a statistical basis. (b) To code and tabulate data for only Manhattan was found an arduous task when each of the 224 sanitary areas of the 1910 map were recognized. (c) In Greater New York, the 1920 census map recognized no less than 3,427 areas. To attempt the segregation and tabulation of the vital statistics for each of these tracts—not to mention the cost of publishing the tables occasionally, if not currently—was practically impossible. (d) There was also a realization that the ordinary mortality statistics before being utilized and compared should be qualified by sex and age. (e) Finally, there has been the migration from Manhattan to the other boroughs.

The need of adequate vital statistics by neighborhoods in New York, yet gathered along practical lines that could be kept up and currently published, led to the creation in 1927 by the Welfare Council of a committee to consider the problems involved in "Local Statistics required for District Health Work."* The report adopted[9] covered several essentials; it indicated that "Four basic types of information

[8] The Committee appointed by Dr. Haven Emerson consisted of *Chairman*, Godias J. Drolet, Shirley W. Wynne, M.D., Thomas J. Riley, Ph.D., and Jane M. Hoey.

should be available: population, health data, volume of local health work, and cost of local health work."

The most practical service rendered by the committee was in securing an agreement on what should constitute a "Health Area Unit." The report stated that "The geographic unit for statistics of local health work in New York should consist of a group of sanitary areas† aggregating approximately 25,000 population"; and "A reconsideration of the geographic units should take place every 10 years after the local results of the federal census are available." Thereby two achievements were realized: first, an opportunity to meet inequalities of growth and to continue the preparation of local facts on a somewhat comparable basis; and second, the recognition by official and private health authorities of a workable number of health areas, 270 for Greater New York.

Of these health areas, built up by combining the smaller and too numerous sanitary areas, Brooklyn, with its population of 2,300,000, has 92; the Borough of the Bronx, with 950,000 population, 48; Queens, with 850,000 people, 39; Staten Island, with 150,000, 10. For the older Borough of Manhattan, with 1,750,000 population, where for years there had been a careful tabulation of all the essential vital statistics for each of 224 sanitary areas, it was decided to maintain the continuity of the data, but to publish them in comparable aggregates as in the other boroughs for 81 health areas only. In each borough, one health area was set aside for parks and cemeteries.

The Welfare Council report recognizing that knowledge of the local population was also required for district work recommended not only an irreducible minimum of items in each unit, consisting of sex, color, nativity, and of seven age groups, but also pointed out that data on occupation and civil status should also be had, and that "health and social agencies . . . should indicate to the state and federal authorities the importance of a census every 5 years in a center changing so fast as New York." Another significant recommendation was that "Enumerations should be taken not only of the night or home population of the various units in the city, but also, at least in Manhattan, of the day-working population—frequently more permanent in its place of employment than in its home."

As practically all of the recommendations of the report concerning local health data have been carried out by the New York City Department of Health, the mortality items covered and the methods followed will be taken up with the description of the actual work now under way.

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† One of the smaller 40-acre census tracts, previously referred to and totalling 3,427 for all of New York City.

For each health unit comparable information on births, the more common infectious diseases, and leading causes of mortality was requested, with the recommendation that it be currently published for each area corrected on the basis of residence and not of occurrence, even for accidents.

ORGANIZATION OF HEALTH DATA

In 1928, both Health Commissioner Louis I. Harris, M.D., and his successor Shirley W. Wynne, M.D., approved the plan recommended. Pending municipal support, the Milbank Memorial Fund and the Welfare Council contributed together $5,000 for clerical assistance to "initiate the compilation of local health statistics."

The next practical step taken was that of the Bureau of Records which prepared an original street index to permit proper assignment of the certificates and reports to be classified.

Certain important definitions in classifying by area of residence have had to be kept in mind. Fortunately for almost twenty years deaths in institutions have, in every case possible, been charged back to the borough of residence of the deceased. In a great city like New York there are also deaths of "unknown" persons or homeless and lodging house men, and of "non-residents" numbering more than 2,000 annually. The numbers of these in each area have naturally had to be stated separately from those for residents only.

The lesser section of local health area statistics in New York is that devoted to communicable diseases. Only ten of the more common conditions registered were recommended for inclusion: tuberculosis, diphtheria, measles, scarlet fever, whooping cough, typhoid fever, influenza, pneumonia, syphilis and gonorrhea, separately for males and females. Let us recall that the usual and complete lists of the reportable diseases and the full standard mortality data are being kept up for the entire city, and for each borough as well.

The task of performing properly the local segregation can be realized when it is seen that this will involve annually the additional coding and handling of at least 125,000 birth certificates and 75,000 deaths, beside the distribution of another 75,000 to 80,000 reports of infectious diseases.

The actual work of classifying local health data throughout the city was started at the beginning of 1929 and several abridged preliminary reports have already been published. The practical aspects of this new service to the community can be better understood by studying the items contained in a work sheet for a single district: First, in each area are the births according to residence of mothers,

separately for white and colored. Second, the mortality data are classified both by sex and color within each of seven age groups: under 1 year, 1 to 4 years inclusive, 5 to 14, 15 to 24, 25 to 44, 45 to 64, 65 and over.

With the comparatively small population included in the areas selected, around 25,000, it was considered essential to have not only the total number of deaths from certain causes, but also qualification of these by sex, color, and at least the more important age groups so as to permit even the standardization of the death rates and to allow thereby for the greater variation in age or sex composition likely to be found in smaller "communities."

In the complete original health area tabulations made in the Bureau of Records, the deaths are also classified separately within each of the following causes or groups of diseases: typhoid, measles, scarlet fever, whooping cough, diphtheria, influenza, poliomyelitis, encephalitis, epidemic cerebrospinal meningitis, pulmonary tuberculosis, other tuberculous diseases, cancer, diabetes, cerebral hemorrhage, heart diseases, arterial diseases, broncho-pneumonia, lobar pneumonia, diarrhea under 2, and over, appendicitis, chronic nephritis, puerperal septicemia, other puerperal causes, congenital debility and diseases of early infancy, suicide, accidents by automobiles, and by other causes, first, by place of occurrence and, second, by place of residence, homicide, other causes, total deaths charged to area, deaths of non-residents and deaths of area residents only.

Accidents, after being charged to place of occurrence, are redistributed to area of residence. This enables one to know also the full mortality, natural and accidental, of all residents of an area. The ordinary method of charging accidents to place of occurrence only, Drolet believes, may, in default of knowledge of the added working or visiting population during the day in business areas, mislead and vitiate the accuracy of the general death rate wanted for residents only.

PUBLICATION

The full tabulation of the reports of the principal communicable diseases and of leading causes of mortality, classified according to sex, color, and important age groups in each of 270 health areas in New York City, has already been completed for most of 1929, and practical use of it has been made by several health agencies.

The problem, however, of printing such detailed information currently and within reasonable cost has been only partially solved thus far. The original recommendation was for a quarterly bulletin, but Department of Health officials, concerned with sanitary supervision,

have pointed out that in the case of communicable diseases it would be more useful to have the bulletins issued at least monthly. The original 270 area records of mortality for the whole city with seven age classifications and a total for each area require 2,160 horizontal lines alone. And the 35 causes of death or groups of data, subdivided into sex and color, amount to 140 vertical columns.

Accordingly, while the complete tabulations, as described, are being kept up in the Bureau of Records, and access is readily granted to recognized agencies and institutions, it is now planned to publish complete tables only annually. However, in the meanwhile, an abridged issue is being published monthly. Economy has been secured by including only the totals, without age classification, but by color for births, deaths under 1 year, and 16 causes of mortality.

USE OF THE HEALTH AREA STATISTICS

Current use of the local reports of births, deaths, and of registration of infectious diseases is already being made by the Bellevue-Yorkville Health Demonstration. By aggregating the returns of the eight health areas in their district, the director of that interesting public health experiment is enabled to send each month to members of the local community health services and participating agencies not only a report on current administrative activities but also the latest information on prevailing contagion, as well as the returns of births and various causes of mortality. The opportunity to test the progress of local public health measures is immediate and there is a guide upon which to base programs in relation to actual needs.

At the East Harlem Health Center, and in the Bowling Green Neighborhood, similar mortality information for the smaller sanitary areas only, already available in the past for Manhattan alone, has been used for special studies of local health conditions.

The latest use of the local health area statistics is that recently inaugurated through Health Commissioner Wynne for a preliminary survey of health center work in New York. With the recent and great shifts of population in the various boroughs the question of locating properly, and where most needed, additional baby health stations, various clinics and new health centers is a constant one—in fact, after the establishment of important central services by the Department of Health the decentralization of certain public health activities is now urgent.

How to undertake neighborhood health work best; how to get near to and reach all sections of the people in a great community—for instance of 1,250,000 school children—is not easily answered. To per-

mit an intelligent consideration of basic facts and needs the Committee on Neighborhood Health Development is first utilizing the health area map, and in each of these units are being spotted existing hospitals, clinics, and schools; after this, are added the latest population figures for each health area, the school registration, and for the first half of 1929, the births, deaths, and cases of infectious diseases. With these data of possible local requirements for maternal and infant welfare work, school medical service, amount of required home sanitary supervision, local mortality rates, and finally of existing institutional facilities or knowledge of their absence, it will be a much more direct process to visualize health needs in every part of the city.

In conclusion, the authors remark that the majority of the American people now live in cities, many of them large; that the ordinary average vital statistics report for an entire community is insufficient to portray the diversified life in the urban centers; that the dependence for segregation upon ordinary political subdivisions is inadequate; that the use of reports of mortality within small units demands care in meeting differences of sex, age, or color; and, therefore, that we point out the practical experiment inaugurated for the current compilation and publication of local health area statistics along standard lines in each of 270 districts throughout New York City.

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Acknowledgments are due Dr. Herman T. Peck, Dr. Charles Bolduan, and Dr. Edward L. Creeden for their assistance in the organization and publication of local health area statistics in New York City.

Vitamin Content of Ethylene-treated and Untreated Tomatoes*

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THE use of ethylene gas for the forced coloration of certain fruits and vegetables, such as citrus fruits, bananas, and tomatoes, has recently attracted much attention from both the commercial and the nutritional standpoints. By this process the development of color characteristic of the ripe fruit can be materially hastened in green, unripe fruit either before or after shipment; and the period during which the fruit can be stored, or shipped from warm to colder regions in advance of the local season, lengthened. It also results in products more uniformly colored, having a firmer texture, and less subject to injury from handling, than those allowed to ripen naturally before being gathered. Ethylene has also been found efficacious in removing the astringency of certain fruits, such as persimmons, due to the presence of tannins.

It has been long known that the coloring or ripening of certain fruits can be hastened by placing the fruit in closed rooms or tents in which oil or almost any other fuel is being burned. The effects were at first attributed to increased temperature and humidity. In 1912 Sievers and True,[1] working on the "sweating" process of ripening citrus fruit, discovered that the hastening of the coloring of lemons was caused by the action of gaseous products of incomplete combustion. Following up this work Denny[2] showed that the constituents of these gases that were most effective were unsaturated hydrocarbons, notably ethylene. In 1923 Denny[3] secured a patent covering the use of ethylene for the forced coloration of fruit. Chace and Denny in 1924[4] contributed additional data on this process.

The blanching effect of ethylene and other constituents of illuminating gas on plants had been early observed by Kroker and Knight,[5] Schonnard,[6] and others. Other contributions on the application of ethylene to the coloration of fruits and the blanching of celery have been made by Chace and Church,[7] Rosa,[8] and Harvey.[9]

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* Read before the Food, Drugs and Nutrition Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.

Soon after the announcement of the ethylene process for treating fruits and vegetables, the *Journal of the American Medical Association*, recognizing the possible harmful effect upon their nutritive value that might result from chemical treatment of foods, particularly with reference to the vitamins, called attention[10] to the need of work to develop information regarding the effect, if any, of the ethylene process on vitamins.

In view of the work that had been done in the U. S. Department of Agriculture on the study and development of the ethylene treatment of fruit, and in conjunction with a continuation of investigation on this subject by the Food Research Division of the Bureau of Chemistry and Soils, we undertook a study of the comparative vitamin value of tomatoes treated and untreated with ethylene gas, and collected at different stages of development.

PREPARATION OF THE MATERIAL*

The tomatoes used were a pure bred strain grown specially for the ethylene studies on the U. S. Department of Agriculture experiment farm at Arlington, Va.

They were collected at three stages of development, immediately washed with water, and handled as follows: Green tomatoes in two stages of maturity were divided into four lots. The lots to be treated with ethylene were placed in earthen jars; ethylene gas was introduced in the proportion of 1 part in 1,000; and the lids were sealed.

The tomatoes were removed from the jars daily, dried and aired, then replaced; fresh ethylene gas was introduced, and the jars were resealed. After treatment with the gas for 5 days, they were ground in a meat grinder, thoroughly mixed, heated in a steam bath, and placed in cans while hot, sealed and processed according to usual cannery practice.

The portions untreated with gas were ground as soon as picked, processed and canned in the manner and under conditions identical with those described for the gas treated tomatoes.

In addition to the green tomatoes referred to, others that had been allowed to ripen naturally on the vines were likewise canned.

There were thus prepared for the vitamin studies five different lots of tomatoes referred to as follows:

Lot 1—Mature, green tomatoes, untreated; i.e., full grown fruit in which the chlorophyl had begun to fade, but which were not ripe

* We are indebted for the material used in the vitamin studies described in this paper to Dr. F. C. Blanck of the Food Research Division of this Bureau, under whose general direction the tomatoes were grown, collected, treated, and canned; also to Dr. L. H. James of the Food Research Division, who personally supervised the work in the preparation of the material.

Lot 2—Tomatoes naturally ripened on the vines—untreated

Lot 3—Immature, green tomatoes, walnut size, untreated, in which the chlorophyl had not begun to fade

Lot 4—Mature, green tomatoes, similar to Lot 1, treated with ethylene

Lot 5—Immature, green tomatoes, similar to Lot 3, treated with ethylene

After being canned, the tomatoes were placed in cold storage.

There were marked differences in the proportion of solid material to juice in the different lots. The cans of mature, ripened tomatoes contained more juice than did the green, immature fruit.

Since tomato juice is used extensively and frequently recommended in infant feeding, and our feeding technic could be greatly facilitated by using the juice, only that portion of the fruit which passed through a fine muslin cloth was used in our vitamin tests.

Owing to the possibility of retention of some of the vitamins in the pulp the results obtained may not represent the full vitamin potency of the tomatoes used. We were interested in comparative rather than absolute values.

The following observations on the canned fruit were noted: Lot 1 showed the development of a little red color. Lot 2 was more deeply colored than Lot 4, although the latter was well within the range of color of commercially canned tomatoes. Lot 5 was slightly darker in color than Lot 3, the small untreated tomatoes. There was no evidence of any licopin formation in Lot 5. We found a marked difference in the quantity of juice that could be expressed from the crushed fruit, depending upon whether or not the tomatoes had been treated with ethylene and also upon the stage of maturity. The average amount of juice obtained in three separate trials was as follows:

Lot 1, 71 per cent	*Lot 3*, 62 per cent	*Lot 5*, 70 per cent
Lot 2, 82 per cent	*Lot 4*, 77 per cent	

VITAMIN A

Curative vitamin A tests were conducted essentially according to our technic as described elsewhere.[11] In the first series four litters of rats showing definite signs of ophthalmia were divided into six groups, each consisting of 2 males and 2 females, 1 animal from each of the four litters. Five groups were fed 5 c.c. of tomato juice daily from each of the five lots of tomatoes as indicated by the figure to the left of each curve in Chart I. The remaining group served as a negative control. The A-deficient diet consisted of alcohol extracted casein, 18 per cent; salt mixture (Osborne and Mendel's), 4 per cent; agar, 2 per cent; yeast, 8 per cent; dextrinized starch, 67 per cent; and peanut oil, 1 per cent. Of the yeast used 0.5 per cent had been irradiated, and its vitamin D potency had been determined.

The tomato feeding was discontinued at the end of 5 weeks, and the animals were then kept on the basal diet until they showed considerable loss in weight. As shown in Chart I the rats which received the naturally ripened tomatoes, Lot 2, made distinctly better gains

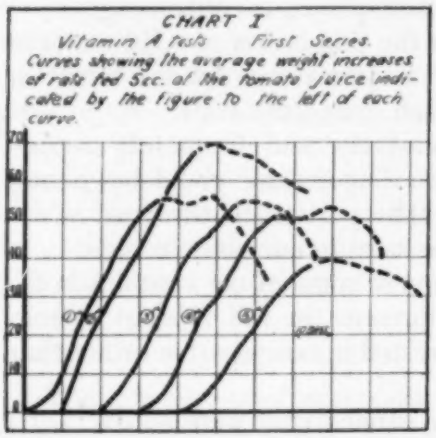
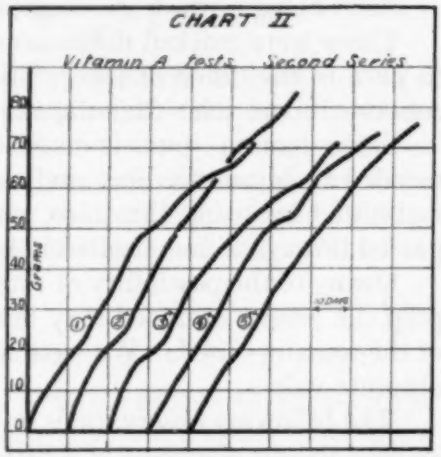


CHART I
Vitamin A tests First Series.
Curves showing the average weight increases of rats fed Sec. of the tomato juice indicated by the figure to the left of each curve.



than those of the other groups. The control rats survived an average of 23 days from the time their litter mates were first fed tomatoes, and all developed severe cases of ophthalmia before death. The other groups all showed improvement of the eyes during the tomato feeding period, but there were no definite cures of ophthalmia. The group receiving tomato juice, Lot 5, did not react differently from the other groups notwithstanding uniformly poorer growth. The sharp breaks in the curves when the tomato juice was withdrawn from the diet shows that the level of tomato fed did not permit storage of vitamin A.

The second series of tests was conducted in the same manner as the first, except that the tomato feeding was carried on for 8 weeks, and the experiment then terminated (Chart II). As in both series of tests the rats receiving Lot 2 tomato juice grew more rapidly than those on any other lot, it is evident that the naturally ripened tomato is the best source of vitamin A. No explanation is offered for the fact that in the first series the rats on Lot 5 did not grow so well as those of the other groups. There was very little individual variation within the group. In the second series the Lot 5 rats showed the largest average gain, with the exception of Lot 2, due to the exceptionally rapid growth of one animal.

At the end of 5 weeks the following average gains had been made in each of the ten groups:

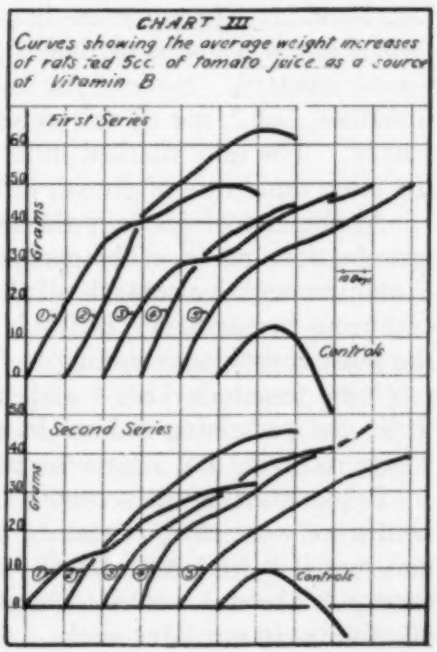
	Lot 1	*Lot 2*	*Lot 3*	*Lot 4*	*Lot 5*
First Test	55	68	54	51	38
Second Test	54	60	52	53	53

VITAMIN B

In the vitamin B tests the following diet was used: Alcohol extracted casein, 18 per cent; salt mixture, 4 per cent; agar, 2 per cent; cod liver oil, 2 per cent; autoclaved yeast, 5 per cent; and dextrin, 69 per cent. The yeast was autoclaved 4 hours at 15 lb. pressure, and previous tests had shown it to be free from the antineuritic vitamin. The casein was similar to that used in the vitamin A tests just described.

In the first series of tests four litters of rats weighing about 60 gm. each were divided into six groups comparable as to size, sex, and parentage. One group received only the basal diet while the others received 5 c.c. per day of the different lots of tomatoes for a period of 60 days. Each curve for the first series seen in the upper portion of the chart shows the average weight increase of 4 rats, 2 males and 2 females. As shown on Chart III the fully ripened tomatoes, Lot 2, were distinctly superior as a source of vitamin B to the other lots, which were all about the same.

Each curve of the second series, begun nearly 3 months later, represents the average weight of 4 male rats. Not more than one animal from one litter was used in a group. In no case did the rats in the second series grow as rapidly as those in the first and there was not the same degree of response in comparable groups. The average gain for all the males in the first series (2 rats in each group) was 53 gm. The average gain in weight for all rats in the second series (all males) was 41 gm. Evidently a marked loss of vitamin B occurred in the canned tomatoes during the period intervening between the two series of tests.



The average survival of the control rats in the first series was 31 days and the second series 41 days. One of the controls in the

first series died at the end of 20 days, about 10 days less than the minimum survival period usually observed.

VITAMIN C

As in the vitamin A and B tests, the vitamin C assays were conducted on two sets of animals. In the first series the interpretation of the results is based upon symptoms of scurvy in the living animals and post-mortem examinations. In the second series, data on survival of the animals were also obtained. The two sets of experiments will be discussed separately. Twenty-eight guinea pigs weighing from 280 to 325 gm. were divided into seven equal groups, five of which received 1 c.c. of tomato juice from the different lots of tomatoes. The other two groups were used as controls. One group received 2 c.c. of orange juice daily, and the other served as a negative control. The basal diet consisted of rolled oats, 69 parts; alfalfa, autoclaved 30 minutes, 25 parts; casein, 5 parts; and sodium chloride, 1 part.

At the end of one month only one control animal showed definite symptoms of scurvy, and the other animals were all apparently normal, with the exception of a slow growth rate in many. Evidently our basal diet was not free from vitamin C. Alfalfa which had been autoclaved 90 minutes was then substituted for that which had been autoclaved 30 minutes. In 2 weeks all of the negative controls showed marked symptoms of scurvy, as did the two groups receiving tomatoes, Lots 3 and 5. Three animals in each of the groups receiving tomatoes, Lots 1 and 4, showed distinct signs of scurvy before the experiment was terminated. None of the animals receiving the naturally ripened tomatoes, Lot 2, nor those receiving orange juice showed any signs of scurvy. The only marked difference between these two groups was the more rapid rate of growth of the orange juice fed animals.

At the end of 58 days the animals were killed and post-mortem examinations made. The groups receiving tomato juice, Lots 3 and 5, and the negative controls all showed severe scurvy. Extensive subcutaneous hemorrhages, brittle bones, and frequently loose teeth were the most conspicuous findings. Three animals in each of the groups receiving tomatoes, Lots 1 and 4, showed subcutaneous hemorrhages, while the remaining animal in each group was apparently normal. Those receiving Lot 2 gave no post-mortem evidence of scurvy.

Before starting the second series of tests we demonstrated that the alfalfa we were using contained a considerable quantity of vitamin C and that if it were autoclaved 90 minutes the animals would develop scurvy in about 3 weeks. Consequently, the alfalfa was autoclaved 90 minutes in our later work.

The second series of tests on the tomato juice was conducted on the same number of guinea pigs, all virgin females, weighing from 250 to 297 gm. The levels of tomato and orange juice fed were the same as in the previous series. Because of the differences in vitamin C content of the various lots of tomatoes, we obtained data on the survival of the animals. At the end of 90 days when the experiment was terminated 7 animals were alive, 1 receiving Lot 1 tomato juice, 2 receiving Lot 2, and 4 receiving orange juice.

Table I gives the days of survival of the animals used.

TABLE I

No Vitamin C	*Lot 1*	*Lot 2*	*Lot 3*	*Lot 4*	*Lot 5*	*Orange Juice*
36	61	59	35	51	56	90
40	90	50	35	44	31	90
41	59	90	48	22	34	90
35	51	90	17	46	43	90

With the exception of the guinea pigs receiving orange juice and 2 animals receiving Lot 2 tomato juice, all of the animals showed unmistakable symptoms of scurvy at the end of 3 weeks. One animal on Lot 1 which survived the experimental period was inactive during the last 40 days, and showed complete loss of control of the hind legs. The 2 animals on Lot 2 which survived the experimental period remained active until the end. At times their wrists were sore and swollen, but scurvy symptoms were transient. Post-mortem examinations revealed evidence of scurvy in both of these animals. All animals which died showed severe scurvy upon post-mortem examination. The control animals all made a steady average gain of about 3 gm. per day until the experiment was terminated.

DISCUSSION

The most practically significant result is probably the evidence obtained showing that naturally ripened tomatoes are a better source of vitamins A, B, and C than any of the others studied, either treated or untreated with ethylene gas.

No material difference was observed in the vitamin A content of the green tomatoes picked at different stages of development, whether or not treated with ethylene. The same was true of the vitamin B content of the different lots as determined in the first series of tests.

The vitamin C value of tomatoes seems to increase as the fruit develops and approaches the mature ripened condition. Naturally ripened tomatoes contained the most vitamin C, full grown, green tomatoes came next, and the small, immature fruit contained the least of all. The ethylene treatment of the green tomatoes produced no

significant change in their vitamin C potency, which was low in all samples of the green fruit tested. The second series of tests for vitamin B gave lower values than obtained in the first series with samples of the same lots. Apparently a loss of this vitamin occurred on storage, for which we have no explanation.

After the work described was well under way, two articles on this subject appeared. Morgan and Smith[12] found that ripe tomatoes were richer in vitamin A than green tomatoes, but that the amount in ripe tomatoes was about the same, irrespective of the methods used in ripening. House, Nelson, and Haber[13] found that green and ripe tomatoes contained essentially the same amount of vitamin B, irrespective of the methods used in ripening. They also found more vitamin A in ripened than in green tomatoes, but the tomatoes ripened by the different methods had the same amount. Their results on vitamin C are in agreement with ours. Our results cannot be satisfactorily compared with those of House, Nelson, and Haber, because these authors fed the whole tomato, while we fed only the juice. Furthermore, they do not give sufficient details regarding the handling of the tomatoes after having been picked from the vines, and they make no statement regarding the length of time the tomatoes were treated with ethylene.

In so far as the use of tomato juice as a source of vitamins is concerned the results of our work indicate that vine-ripened tomatoes are preferable to those picked green and treated with ethylene gas to develop the color characteristic of ripe fruit. No indication was observed that the ethylene treatment had any deleterious effect upon vitamins already developed.

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NOTE: Acknowledgment is made to J. P. Devine of this division for technical assistance in carrying out the experimental work.

Seasonal Distribution of Typhoid Fever—Southern and Northern States*

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MANY diseases exhibit a marked seasonal variation in their incidence, a phenomenon of perpetual interest to epidemiologists. Recently some evidence has been brought forward which indicates that this phenomenon may depend to some extent at least upon periodic changes in immunity caused by seasonal variations in the physiological activities of the human body. Aycock[1] has discussed the differences observed in the incidence of poliomyelitis from this point of view and suggests these may depend upon variations in human physiology rather than upon variations in the virus. Experimental studies carried out by Arnold[2,3] on dogs indicated that the secretion of hydrochloric acid by the stomach was diminished when the external temperature was high. This in turn was found to disturb the acid-base equilibrium of the upper part of the small intestine, with the result that the "self-disinfecting" power of the mucous membrane was reduced, as shown by the fact that the duodenum no longer had its usual ability to destroy organisms introduced into it. In this instance also variation in immunity seems to be due to variation in physiological activity. Arnold points out that in view of his experimental studies it would be expected that typhoid fever would be more prevalent in summer than in winter, a deduction which agrees with epidemiological experience. The greater prevalence of typhoid fever in summer may thus be ascribed to the heat associated with that season.

These explanations suggested that it would be of interest to compare the seasonal distribution of the yearly incidence of typhoid fever exhibited by southern states with that by northern states.

Since it had been shown[4] that for measles, diphtheria and scarlet fever the peak of the incidence for each occurs a month or two earlier in the southern than in the northern states, and since the southern part of the United States experiences a high temperature earlier in

*Read before the Vital Statistics Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 2, 1929.

the summer than the northern, it was decided to see whether there was any difference in the time of the maximum occurrence of typhoid fever in these two sections. Time series representing the occurrence of typhoid fever by months over a period of years (1912–1928) for a number of states were studied and for each successive complete seasonal swing or wave of a series the month of maximum incidence was noted. A month of maximum incidence is the month within the limits of one complete seasonal swing or wave for which the maximum number of cases is recorded.

No state was used for which adequate data had not been published in the Annual Summaries of the Notifiable Diseases appearing in *Public Health Reports*. In order to have as much separation in latitude as possible between a group of southern and a group of northern states, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee were included in the former, and Connecticut, Maine, Massachusetts, Michigan, Minnesota, Montana, North Dakota, New York and Wisconsin in the latter.

For the former group July, while for the latter group September, was most frequently the month of maximum incidence. In other words, by the method used, the peak of the incidence of typhoid fever for the states studied was shown to occur two months earlier in the southern than in the northern group. The frequency distribution of the months of maximum incidence obtained for each group of states is presented in Table I and Figure I.

TABLE I

FREQUENCY DISTRIBUTION OF THE MONTHS OF MAXIMUM INCIDENCE OF TYPHOID FEVER

Month	Southern States	Northern States
Jan.	1	2
Feb.		1
Mar.		3
Apr.	4	1
May	1	3
June	6	2
July	51	4
Aug.	37	26
Sept.	9	66
Oct.	1	27
Nov.	1	8
Dec.	2	2
Total	113	145
Most Frequent Month	July	September
Mean	July 13	August 21

By this method of analysis only the month of maximum incidence of any individual seasonal wave was considered. Furthermore, the experience of all years was included without regard to whether they were epidemic or non-epidemic in character. In addition to the information which this approach furnished, it was desirable to ascertain the characteristics of a typical seasonal wave derived

from the data of the southern states and also of one from the data of the northern states. Both of these were needed in order that a comparison might be made as to the distribution of cases by months throughout an entire year. A number of such seasonal waves or curves were obtained by various methods.

To insure that each wave or curve would be based upon a sufficient number of cases to give some degree of stability to the result, the figures representing the monthly incidence were combined. For the nine southern states the total number of cases of typhoid fever during the period 1912–1928 was obtained by simple addition. The total number for each month was obtained in the same way and expressed as a percentage of the grand total. A similar procedure was followed for the nine northern states. The percentage seasonal distribution of cases for each area appears in Table II and Figure II. A comparison of the two curves clearly indicates that typhoid fever reaches its maximum earlier in the south than in the north. Certain objections, however, can be legitimately raised to percentage seasonal distributions of cases thus derived. Data for each year of the entire period of seventeen years were not available for every state; the method assumed that a typical distribution could be obtained by using the arithmetical mean, and the degree to which the result might be affected by the weight of a large state was undetermined.

To deal with these objections and to test the reliability of the derived seasonal curves, a different procedure was tried. A southern combined area was formed which included Alabama, Louisiana and Mississippi; and a northern one which included Connecticut, Michigan, Minnesota, New York and Wisconsin. The composite monthly incidence of typhoid fever for each area was next obtained by adding together for the included states all the figures representing the in-

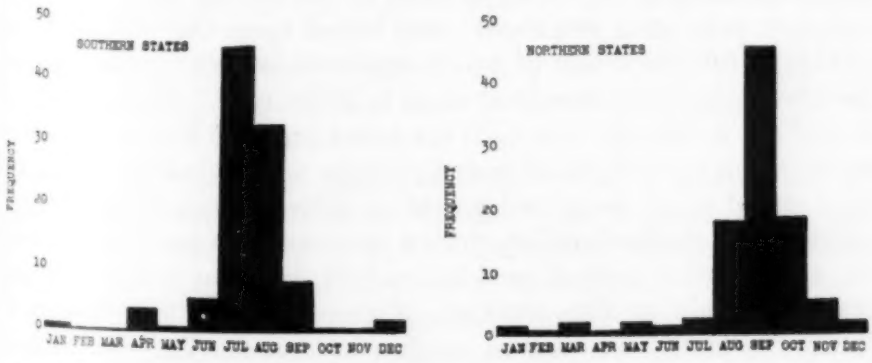

FIGURE I—Typhoid fever. Frequency distribution of 100 months of maximum incidence

cidence of corresponding months. This method of combining numbers of cases and the fact that the composite monthly incidence of the two areas was to be compared by means of averages, as explained below, required that data for each and every state, without regard to the area in which it was included, must be available by months over the same period of time. The limitation to these states and the period 1915–1928 was dictated by this requirement.

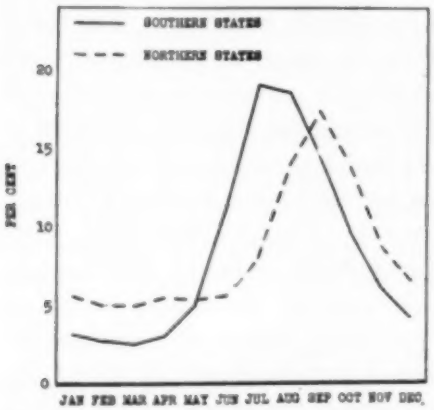

FIGURE II—Percentage seasonal distribution of typhoid fever for a year of mean incidence calculated for the period 1912–1928

TABLE II

PERCENTAGE SEASONAL DISTRIBUTION OF TYPHOID FEVER FOR A YEAR OF MEAN INCIDENCE CALCULATED FOR THE PERIOD 1912–1928

Month	Nine Combined Southern States	Nine Combined Northern States
Jan.	3.15	5.61
Feb.	2.73	5.00
Mar.	2.46	4.87
Apr.	2.97	5.43
May	5.02	5.26
June	11.37	5.64
July	18.99	7.88
Aug.	18.63	13.70
Sept.	14.64	17.42
Oct.	9.75	13.80
Nov.	6.16	8.78
Dec.	4.15	6.61

The next step was to obtain for each area the incidence of a typical year distributed by months, really a seasonal wave. The experience of any given year, because of the irregularities it might exhibit, was considered unsatisfactory and therefore the incidence of a typical year was calculated from the recorded experience of all the years in the period considered. Two methods of calculating the incidence of a typical year were employed—one based upon the median as an average, a full discussion of which appeared in a recent article,[6] and the other upon the arithmetical mean as an average. The former was carried out as follows: For each combined area the figures representing the incidence of typhoid fever for all the various included Januarys were placed in an array and a central value corresponding approximately to the median was determined by means of a parabolic smoothing, and a similar method used for each of the other months. These twelve monthly median numbers of cases were added together to obtain the total for a year of median incidence. The median incidence of each month was expressed as a percentage of this total, the

twelve resulting percentages being an expression of the seasonal distribution of the cases in a year of median incidence.

In obtaining the incidence of a typical year based upon the arithmetical mean as an average, the mean of each array was calculated instead of the median. The twelve monthly mean numbers of cases were added together and the mean incidence of each month expressed as a percentage of this total.

Table III reveals that both procedures gave approximately the same result. In other words, the arithmetical mean turns out to be a suitable average to use in calculating the incidence of a typical year. Furthermore, a comparison of the seasonal distributions thus derived for the two combined areas (see Table III and Figure III) confirms the observation that the peak of the wave for the northern area occurred two months later than that for the southern area. There is also some slight though inconclusive evidence that the wave for the southern states is less peaked than that of the northern.

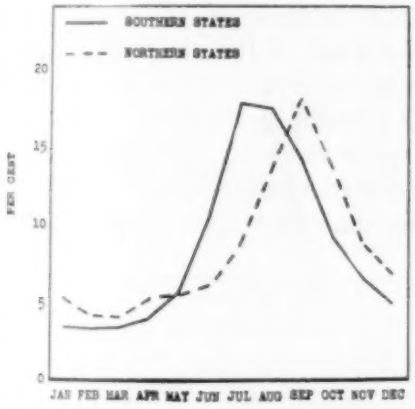

FIGURE III—Percentage seasonal distribution of typhoid fever for a year of median incidence calculated for the period 1915–1928

TABLE III

PERCENTAGE SEASONAL DISTRIBUTION OF TYPHOID FEVER CALCULATED FOR THE PERIOD 1915–1928

Month	Three Combined Southern States		Five Combined Northern States	
	For a Year of Mean Incidence	For a Year of Median Incidence	For a Year of Mean Incidence	For a Year of Median Incidence
Jan.	3.56	3.41	5.68	5.35
Feb.	3.23	3.31	5.05	4.17
Mar.	2.96	3.39	5.26	4.11
Apr.	3.52	3.85	5.27	5.19
May	5.63	5.56	5.00	5.51
June	11.54	10.46	5.80	6.13
July	18.28	17.79	7.89	8.68
Aug.	17.94	17.53	13.85	13.49
Sept.	13.40	14.07	17.00	18.06
Oct.	9.05	9.21	13.40	13.67
Nov.	6.36	6.53	8.79	8.82
Dec.	4.52	4.88	7.01	6.84

Table IV shows that each state exhibited in a general way the same seasonal distribution as the combined area to which it belonged. The results, therefore, which had been obtained were not due to the effects of one large state, in other words, to weighting.

An attempt was made to determine whether there had been any tendency for the seasonal distribution of cases to change with the passage of time. For the first three years and the last three years of

TABLE IV

PERCENTAGE SEASONAL DISTRIBUTION OF TYPHOID FEVER FOR A YEAR OF MEDIAN INCIDENCE CALCULATED FOR THE PERIOD 1915–1928 FOR VARIOUS STATES

Month	Southern States			Northern States				
	Louisiana	Mississippi	Alabama	Connecticut	New York	Minnesota	Wisconsin	Michigan
Jan.	3.94	3.33	2.61	3.12	5.62	5.27	6.98	5.04
Feb.	4.13	3.20	2.82	2.80	4.17	5.47	6.03	3.78
Mar.	3.67	3.10	2.34	3.43	3.59	7.42	6.35	5.63
Apr.	5.78	3.99	2.66	4.05	4.60	6.25	7.30	6.30
May	7.43	5.37	4.84	4.98	4.71	6.05	7.94	4.85
June	11.28	11.14	10.11	5.92	5.62	6.05	6.35	6.50
July	13.39	18.39	18.84	9.35	8.41	8.20	6.67	7.37
Aug.	14.86	16.31	22.57	18.69	14.13	11.91	9.84	11.15
Sept.	12.02	13.77	15.06	19.31	20.04	14.06	13.33	17.08
Oct.	8.81	9.85	9.26	14.95	14.20	14.65	11.43	15.23
Nov.	6.88	7.22	5.06	6.85	8.51	8.20	11.43	10.09
Dec.	7.80	4.35	3.83	6.54	6.41	6.45	6.35	6.98

the period 1915–1928 percentage seasonal distributions of cases were calculated. Because it had been found that computations based upon the mean gave results quite comparable to those based upon the median, the method just outlined—making use of the arithmetical mean—was employed. The results for both combined areas are presented in Table V, Figures IV and V. The percentage seasonal distribution of cases for each area has remained quite constant although there has been a marked decline in the incidence of typhoid fever. This is in agreement with Mills's[6] observation that over quite a long period

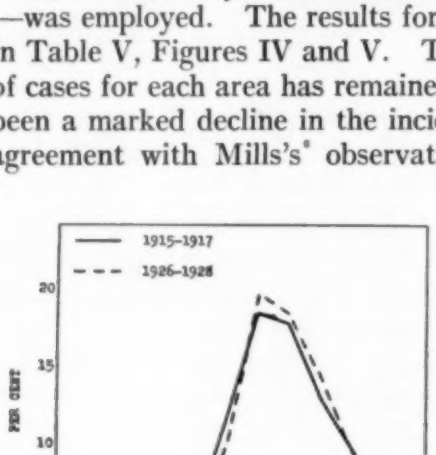

FIGURE IV—Percentage seasonal distribution of typhoid fever for a year of mean incidence calculated for three combined southern states

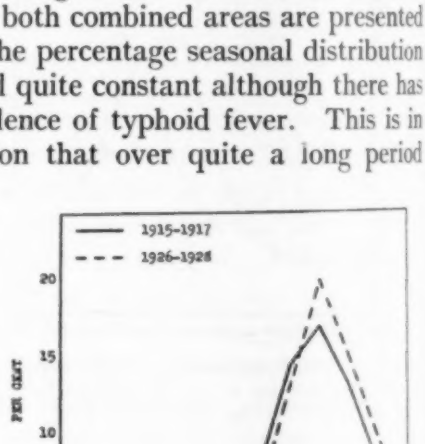

FIGURE V—Percentage seasonal distribution of typhoid fever for a year of mean incidence calculated for five combined northern states

there had been no change in the seasonal distribution of typhoid fever deaths in certain cities.

The incidence of typhoid fever per 100,000 population is much higher in the southern part of the United States than in the northern. The question arose as to whether the seasonal distribution observed in the southern area might not be related to this concentration of cases. To investigate this point the seasonal distribution of the northern combined states for 1915–1917 associated with an incidence rate of about 4.6 was compared with that for the southern combined states for 1926–1928 associated with an incidence rate of about 7.7. Table V, columns 3 and 4, together with Figure VI, further suggests that there is a distinct difference between the percentage seasonal distribution of cases for the two respective areas.

TABLE V

PERCENTAGE SEASONAL DISTRIBUTION OF TYPHOID FEVER FOR A YEAR OF MEAN INCIDENCE

Month	Three Combined Southern States		Five Combined Northern States	
	Calculated for the Period 1915–1917	Calculated for the Period 1926–1928	Calculated for the Period 1915–1917	Calculated for the Period 1926–1928
1	2	3	4	5
Jan.	3.94	3.20	5.77	6.88
Feb.	3.30	3.21	6.47	5.19
Mar.	2.48	3.15	6.12	5.44
Apr.	3.05	3.48	5.31	3.77
May	5.22	4.83	4.74	3.97
June	11.46	9.91	5.92	4.69
July	18.31	19.58	7.67	6.57
Aug.	17.67	18.31	14.12	13.00
Sept.	13.03	14.49	16.59	19.72
Oct.	9.91	9.91	12.90	14.90
Nov.	6.70	5.89	8.15	9.98
Dec.	4.93	4.04	6.23	5.89

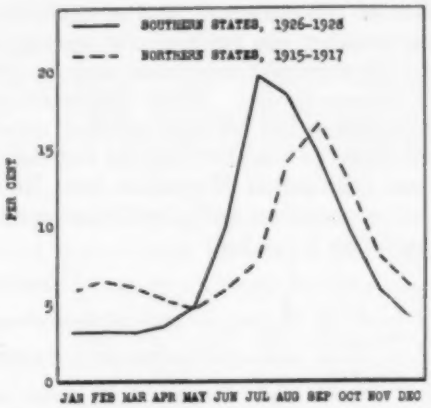

FIGURE VI—Percentage seasonal distribution of typhoid fever for a year of mean incidence calculated for certain areas and periods

SUMMARY AND DISCUSSION

A comparison of the seasonal distribution of typhoid fever in certain of the southern and certain of the northern states has been made.

Evidence has been presented which indicates that for each latitudinal group the seasonal distribution of typhoid fever has not changed with the passage of time even though there has been a marked decline in the incidence.

Some evidence has been brought forward which tends to show that the seasonal distribution of typhoid fever is independent of the incidence rate.

It has been shown that each group has a distinct seasonal distribution.

The conclusion seems justified that the curve of the seasonal distribution of typhoid fever cases for the southern states differs from that for the northern states in reaching a maximum earlier, and in exhibiting a slight tendency toward a greater proportionate concentration of cases during the hot months of the year. This would seem to imply that there are forces favoring typhoid fever which operate during the hot part of the year with greater intensity and over a longer period of time in the south than in the north. Since the southern section experiences a high temperature earlier in the year than the northern, and since the period of high temperature lasts longer, the difference observed is what might have been expected if high external temperature were responsible for the greater prevalence of typhoid fever in summer.

Study of the seasonal curves for southern states or areas (Figures II, III, IV, V and VI) reveals the fact that they start to decline while the temperature is still high. How is this to be explained? Arnold's studies[2,3] suggest the possibility that after a period of exposure to a high temperature the body gradually adapts itself to this external condition, with the result that the altered defensive mechanism of the intestinal mucosa again becomes normal even before the advent of cold weather can produce any restorative effects, and that possibly the influence of high external temperature may be offset toward the latter part of the summer by changes in diet. While differences in the distribution of temperature between the southern and northern sections, either as it affects the human body, or perhaps the means of transfer, may be responsible for the observed differences in the seasonal distribution of typhoid fever, the effects of other possible variable factors such as moisture and ultra-violet radiation may need to be considered before a conclusion is reached.

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Value of the Newly Identified Types in the Study of the Epidemiology of Pneumococcus Infections*

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THE early work on pneumococci disclosed the fact that they did not all belong to the same immunological type. In this country and Europe, Types I, II, and III were isolated and preserved. In adults in New York and vicinity between 50 and 60 per cent of all pneumonia cases were found to be due to these types. The remainder were gathered together as Group IV. These pneumococci, however, did not really form a group. They were simply those which had not been classified, as I, II, or III. This separation of the three main types was most valuable, but the impossibility of identifying about one-half the pneumococci from cases of pneumonia in adults and two-thirds of them in young children, was a great drawback in detecting the spread of infection, and appreciation of this stimulated further investigation. Very briefly the history of the separation of additional specific types is as follows:

In 1915, Avery[1] separated from characteristic Type II pneumococci two sub-types which differed immunologically from each other and from Type II. A year later Lister[2] noted that in South Africa the most frequently occurring strain was of a type different from I, II, or III. Olmstead in New York during the same year made a study of 213 distinct strains of pneumococci and classified them into 12 immunological groups. Cooper[3] and Mishulow in 1919 and 1920 differentiated 19 types. Griffith[4] in 1922 studied 49 strains, none of which belonged to Types I, II, and III. He distinguished 12 distinct serological types. Robinson[5] in 1928 in Pittsburgh noted that in all the cases occurring in a localized outbreak of pneumonia in that city, only 1 type of pneumococci was obtained, and this was not I, II, or III.

These and other researches indicated the need not only of separating the Group IV pneumococci as far as practicable into the several types comprising it, but also of preserving the type strains, and for the

* Read before the Epidemiology Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.

different types, a specific serum for each. The possession of the cultures and their specific serums would make it possible not only to utilize them to identify newly isolated pneumococci, but also to send them to other laboratories, so that the presence and frequency of any of these types in any other parts of the world could be determined. There would of course be other uses of these additional preserved types, such as determining their seasonable variations and estimating the curative value of a specific antibacterial serum for each.

After a conference, Cooper in 1927 decided to undertake this work. She has now identified, and has in her collection, cultures of 17 additional types. The majority of what would have previously been unclassified pneumococci can now be identified. Many interesting facts have been developed. Thus the pneumonia cases in adults and children in Bellevue and Harlem Hospitals have been typed, and we have noted the relative occurrence of the different types. Up to the end of 1928, she had only 13 types fully worked out. For each of these she had a specific agglutinating serum. Before referring to the results obtained it is necessary to note that Westlung[4] and others had noted a much larger percentage of Group IV pneumococci in the pneumonias of children than in those of adults.

Westlund's tabulation of the reports of others is shown in Table I.

TABLE I

TYPES OF PNEUMOCOCCI IN PNEUMONIA

	Adults (1,552 Cases) per cent	Children (401 Cases) per cent
Type I	36.0	26.0
Type II	28.0	11.0
Type III	13.0	8.0
Group IV	23.0	55.0

Cooper's own investigations on the pneumonias of children yielded most interesting results (see Table II).

Turning to the results obtained in the Laboratories of New York and Cornell Universities in our own investigations we find the same general distribution of Types I, II, and III and Group IV, but now we have the added interesting information as to the distribution of a considerable percentage of the pneumococci into 10 other types, and of the differences of the percentages of each type not only between adults and children but also between older and younger children.

Before giving an example of the value of the possession of specific

TABLE II

INCIDENCE OF PNEUMOCOCCUS TYPES IN CHILDREN

	Lobar Pneumonia Uncomplicated (59 Cases) Total Incidence per cent	*Broncho-pneumonia* Uncomplicated (23 Cases) Total Incidence per cent	*Other Respiratory Diseases* (13 Cases) Total Incidence per cent	*Non-respiratory Diseases* (48 Cases) Total Incidence per cent
Type I	6.7	8.7	0.0	0.0
Type II	16.9	8.7	30.7	8.3
Type III	1.6	4.3	0.0	2.1
Group IV	62.7	47.8	61.5	47.9
No pneumococci	11.8	30.4	7.6	41.6

serums for each of the newly established types in detecting an outbreak due to one of them, let us consider the stability of types.

It has been long established that the majority of people in cities carry pneumococci in their throats. These generally belong to the unclassified or Group IV strains. Now we realize that Group IV is simply the lumping together of a number of types, each of which is represented in adults by a smaller percentage of pneumococci than Types I, II, and III, but in children some of these predominate. Each of these types is just as clear-cut as I, II, and III.

TABLE III

THE RESULTS OF TYPING GROUPS OF ADULT PATIENTS FROM THE SERVICE OF DR. JESSE G. M. BULLOWA AT HARLEM HOSPITAL AND OF CHILDREN FROM THAT OF DR. HENDEE SMITH AT BELLEVUE HOSPITAL

Incidence of Types in the Pneumonias of Adults, Infants and Older Children *

Type	Percentage in 154 Adults		Percentage in 89 Infants		Percentage in 58 Older Children	
I	30		4		19	
II	18		1		4	
III	11	59%	3	8%	0	23%
IV	6		3		2	
V	2		0		15	
VI	2		15		8	
VII	4		3		4	
VIII	1		0		2	
IX	2		8		0	
X	2		0		2	
XI	1		0		0	
XII	1		1		1	
XIII	1		2		0	
Unclassified	17	39%	57	89%	44	77%

* Material from children obtained by Raia and typed by Schultz in the laboratories of Cornell University. Adult material typed by Cooper in the Research Laboratory of the Health Department.

Are the types of pneumococci fairly permanent, or are they constantly shifting? Griffith, in England, believes that they readily change and that this frequently happens at the time of convalescence. The results of our own researches agree with those of earlier investigations. Stillman found that during and after convalescence, the type of pneumococcus persisted for many days. In 53 cases of lobar pneumonia the shortest period in which the specific type persisted was 7 days, and the longest 85 days. Under natural conditions we expect therefore that a pneumonia due to a definite type of pneumococci will disseminate this type to others.

Let us now turn to a striking instance when one of the new types was responsible for an outbreak of pneumonia in an institution and in all probability of colds as well. Without a specific serum on hand the cause of the outbreak would have escaped us.*

In an institution for the care of about 700 children between 3 and 16, equally divided between boys and girls, an epidemic of colds and pneumonia occurred. This developed among the boys with the exception of one girl. The outbreak occurred first among the younger children and then among the older who were in contact with them, and then among those of all ages. Schroder, who has charge of the immunization of the children against diphtheria and scarlet fever, happened to learn of the epidemic just as it was beginning to abate. She gathered as much data as possible as to the method of spread of the disease, and obtained culture material on swabs from the pharynxes of 9 cases. From this material Cooper obtained in 7 cases pneumococci which were found to be Type V of our new classification. The onset of the cases was characteristic of a local epidemic of a communicable disease. Within 10 days of the development of the first case the peak occurred. On one day 34 cases developed. The outbreak then rapidly declined. Of something over 100 children who were sick, 30 per cent had pneumonia. The others had symptoms and physical signs of either bronchitis or common colds. While all the 7 positive cultures were from cases of pneumonia, we have no doubt the cases of bronchitis and colds were also due to the pneumococcus, since there were all gradations in severity from the mildest cold to a fully developed pneumonia, and the different severities of the disease occurred proportionately throughout the attack. If Cooper had not had a specific agglutinating serum for the type there would have been no probability of working out the relation of the pneumococcus to the

* The full account of this outbreak, by Schroder and Cooper, will be printed in an early number of the *Journal of Infectious Diseases*.

outbreak. Through having accessible the specific serums for these added types, we have increased our chances of gaining valuable knowledge concerning the spread of pneumococcus infections, especially among children.

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Antiseptics

THE old adage, "There is nothing new under the sun," is constantly being emphasized. In a recent publication,[1] there occurs an interesting discussion of the words "antiseptic" and "asepsis," which are generally considered to be of modern origin, yet "antiseptic" is found in medical literature in the middle of the 18th century, and was commonly used by the laity.

In the "Gentleman's Magazine" (1751) we find the statement, "Myrrh is twelve times more *antiseptic* than sea salt." St. Blancard's lexicon (1777) contains the following definition: "Antiseptica, sunt remedia interna et externa, quae putridini resistunt." According to Ebstein, the use of gloves in obstetrics was advocated in the year 1758.

An interesting letter by George Foster,[2] written in 1791, says: "I had no desire to eat, etc.—all the symptoms of a general breakdown. Drank quantities of vitrol acid and ate kraut conserve. In short I was kept *antiseptic* and after a few days I became better. I now felt hollow and empty and very weak on my legs."

Semmelweis and Lister both brought forward what we now call antiseptics, using sodium chloride, chloride of lime, alcohol, etc. The surgeons of that day seemed to use antiseptics with the idea of rendering decomposition harmless, but Semmelweis, who used them on his hands to prevent infection, said: "You should work with clean hands." Fleetwood Churchill said: "A *gentleman's* hands *are* clean."

An interesting sidelight is thrown on the slow acceptance of Lister's teaching in England. It was explained that the Germans were known as a dirty people, and therefore antiseptics might be necessary for them, but in England, they were superfluous. It was not necessary there to demand the cleansing and disinfecting of the finger nails because a "gentleman cleans his finger nails in his sleeping room."

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Public Health Nursing Legislation What It Should Include*

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LAWS governing public health nursing have been enacted in the majority of states, Massachusetts and Pennsylvania having been the first to pass such legislation in the year 1911. Since then laws have been placed upon the statute books nearly every year, and some of them have been repealed.

Many general health laws include public health nursing and provide for the employment of nurses, sometimes defining the type of work to be done, such as child hygiene, tuberculosis, school nursing, or other specialized work to which nurses are assigned. It is not intended here to give a résumé of the various state laws governing public health nursing. Such information may be found in *A Review of State Laws on Public Health Nursing* by James A. Tobey.[1]

In that study it is noted that there are no standard requirements; the territory covered may be state, county, city, town or village, or may not be designated. The duties in some instances apply to specialized work, or they may not be definitely defined; supervision is vested in the state commissioner of health, a health officer, county commissioners or county supervisors, school boards of trustees, or city or town councils, or no specific body may be mentioned to whom the nurse is responsible. In some state laws professional qualifications are outlined and in others none are mentioned.

It is realized that conditions vary in different parts of the country, which might make it seem to some that no standard regulations would be universally applicable. There are certain fundamental principles applying to public health nursing which were recognized as essential in the very earliest days of visiting nursing. The first and most important are that nurses shall be well prepared for the work, and that adequate supervision shall be provided. Some apply to the observance of professional etiquette, coöperation with other workers and

* Read before the Public Health Nursing Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

agencies, the importance of accurate records, and others as defined in *Public Health Nursing*, by Mary Gardner.

These principles have been adhered to wherever successful work has been engaged in, and will without doubt apply for all time everywhere.

It is assumed that the state is interested in recognizing the professional ability of the nurse as a community worker and that it desires to protect the public from untrained workers, and guard the profession against unskilled competition. The objectives in legislation governing public health nursing are:

1. To secure for the public the graduate nurses best prepared and otherwise qualified for public health work
2. To provide for the worker the best conditions under which to carry on the work

Legal standards should be minimum standards, and sufficiently flexible to provide for future developments in order to avoid frequent changes in the law which may lead into unforeseen difficulties. Good public health nursing laws should provide for the following:

1. The creation of a bureau or division of public health nursing in the state department of health, headed by a nurse director appointed by the state commissioner of health
2. The statement of minimum qualifications required for all public health nurses
3. The power of appointment by local authorities
4. The definition of duties
5. The creation of an advisory board or nursing committees

The director of such a bureau or division should meet the requirements as outlined by the National Organization for Public Health Nursing. She should have a good educational and professional background, be a worthy representative of her profession, and be familiar with all phases of nursing in her own state. She should have the power to develop her work, as other heads of divisions do, and a free hand in selecting personnel. She should be able to prepare and advise on budget requirements, salaries and travel expenses for staff nurses, clerical help, and equipment.

The purpose of a division or bureau of public health nursing is to educate, organize and standardize the service in the state; to supply qualified nurses to other divisions of the department; to meet qualifications set by the state department of health; to define duties broadly to include all branches of public health nursing; and to aid in securing the appointment of nursing committees representing public officials, representatives of medical societies and lay persons interested in or sponsoring the service.

A roster of public health nurses in the state (by counties) giving name, address, type of work, salary and preparation of nurse, and previous positions held, should be readily available for study and comparison, and other nursing information should be on file in good form.

In New York State the law created in 1913 states that there shall be a division of public health nursing in the State Department of Health, and the Public Health Law permits the Public Health Council (an advisory body) to prescribe the qualifications for public health nurses as also for health officers. This seems desirable to meet frequently changing requirements without continually enacting or repealing laws.

Such a division or bureau should—

1. Furnish advisory, supervisory or consultant service and conduct demonstrations
2. Place nurses and aid them in maintaining good standards
3. Provide record and report forms and supervise their use
4. Coöperate at all times with state and local agencies who are carrying on public health work, whether employed from public or private funds

For staff and for local appointment, nurses should meet the requirements of the nurse practice act in their own state and be qualified for public health nursing according to standards set by their state department of health. Legislation should permit local boards of health and education to employ nurses in cities, towns and villages.

The duties should be broadly outlined, covering the general phases of public health work, such as maternity, infancy and child hygiene, tuberculosis, social hygiene, communicable diseases, school nursing, and bedside care as needed in emergency.

The Public Health Law of New York State, Article III, reads as follows:

> Each health officer or other official exercising similar duties, by whatever official designation he may be known, shall have power to employ such number of public health nurses as in his judgment may be necessary within the limits of the appropriation made therefor by the city, town or village. They shall work under the direction of the health officer and may be assigned by him to the reduction of infant mortality, the examination or visitation of school children or children excluded from school, the discovery or visitation of cases of tuberculosis, the visitation of the sick who may be unable otherwise to secure adequate care, the instruction of members of households in which there is a sick person, or to such other duties as may seem to him appropriate.

This seems to be inclusive of all duties to which a nurse may be assigned.

Legal provision for the appointment of an advisory council or public health nursing committee is a wise requirement. Such a committee should consist of members of the official body which employs

the nurse, representatives of the local medical society, preferably health officers, and lay persons who are interested in the progress of public health nursing or those who have previously sponsored the work, such as members of the nursing committees of the American Red Cross or representatives of civic and church organizations. Such a committee would be an important factor in avoiding political appointments of nurses and in other ways giving morale to the work.

What board members can do for the work was ably defined by Michael M. Davis, Ph.D., in an address on "Functions of Boards of Trustees and Committees," given at the American Nurses' Association Meeting and Institute for Board Members.*

Ten Duties for Board Members—

1. To know why the organization exists and annually to review why it should
2. To govern a board or a committee through joint thinking, not by majority vote
3. To give money, or help get it, or both
4. To face budgets with courage, endowments with doubt, deficits without dismay, and to recover quickly from a surplus
5. To deal with the professional staff as partners
6. To keep far enough ahead of the community to be progressive, and close enough to it to be practical
7. To interpret health work to the public in words of two syllables
8. To deal with physicians on the assumption that the highest ideals of the profession dominate its every member and to face difficulties with recognition that both doctors and board members are human
9. To be proud of a tradition but eager to improve it
10. Always to combine a New England sense of obligation with an Irish sense of humor

When public health nursing legislation is proposed to be introduced in a state, a lawyer's advice should be secured. It is wise to give careful thought to the wording, defining the minimum requirements and making the law sufficiently flexible to allow for the constant expansion in public health activities.

* Reprinted in *Am. J. Nurs.*, June, 1929.

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1. Reprint from *Pub. Health Nurs.*, 15, 4: 179 (Apr.), 1923. A 1930 revision will appear in *Pub. Health Nurs.* in an early issue.

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ANTIRABIC TREATMENT PARALYSIS

THE appearance of paralysis during and following the administration of antirabic vaccine is one of the accidents which we must recognize as inherent in the preventive treatment. Fortunately, its occurrence is rare, but unfortunately, the etiology is unknown, in spite of the study which has been devoted to the matter.

The explanations given have not been satisfactory. Some have held that it was due to a dose of the street virus which without the vaccine would have proved fatal, and others that it was directly due to the fixed virus. Busson holds that under certain conditions the fixed virus may become neurotropic, and lays stress on the presence of fixed virus in the nervous system of those who succumb. Tinti considers it an anaphylactic phenomenon. Harris feels that individual susceptibility to rabbit brain is the chief factor. It is now widely believed to be due to the action of some unknown substance contained in the vaccine. We can only accept the statement of the Rabies Conference that our knowledge does not enable us to make positive assertions as to the etiology.

Among the predisposing causes, alcoholism, syphilis, neuropathic constitution, cold, fatigue, and overwork were mentioned at the International Rabies Conference in 1927, at which Remlinger presented a study of the accidents following vaccination against rabies in Pasteur Institutes which covered practically the entire world.

In the vast majority of cases, the injection of living fixed virus vaccine is harmless. Paralytic accidents are less frequent when glycerinated or carbolized vaccines are used, and for this reason, some insti-

tutes have adopted the use of dead or attenuated material, though cases have followed the use of all methods. Those affected are most commonly between 20 and 60 years of age, and belong to the intellectual professions, comparatively few cases occurring among the natives of tropical countries and children. The intensive treatment is more often followed by paralysis than the regular.

In view of the facts, the Pasteur treatment should not be advised without a careful consideration of all the circumstances. On the other hand, since its protective value is undoubted, and wonderful results have followed its use, it should not be withheld from an exposed patient without good reason. With a definite diagnosis of rabies in the biting animal, and a wound, there should be no hesitation in giving the treatment. The International Rabies Conference was equally divided as to the necessity of treatment of persons with whose skin the saliva of a rabid animal had come into contact, even when there was no visible break. The number of deaths from post-vaccinal paralysis is about 100 times that of cases of hydrophobia due to the licking of the skin by rabid dogs. When the mucous membrane was contaminated in this manner, the great majority advocated the Pasteur treatment.

In certain cases, it seems advisable to keep the patient at rest in bed, but the large number of patients who take the treatment at home and pursue their ordinary avocations without bad results, indicates that this measure should be taken only in extreme cases.

The number of cases of paralysis varies, but in all series reported, the percentage is extremely small, and fatal cases are rare.

Remlinger gives the percentage of cases as 0.28 per 1,000, or 1 for every 3,538 persons treated. When symptoms appear during treatment, as they do in about two-thirds of the cases reported, the injections should be discontinued, and the patient put at rest. The reports of two recent cases,[1] one fatal, and one ending in recovery, describe the symptoms and give additional facts.

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HOW MUCH TOXIN–ANTITOXIN IS NECESSARY

THE Michigan Department of Health has made exhaustive studies on the amount of toxin-antitoxin work necessary to rid a community of diphtheria. While this varies widely, depending upon density and age distribution of the group immunized, some generalizations are evident.

The department has been furnishing toxin-antitoxin free of charge for a period of 6 years. The counties, cities and smaller districts that

have immunized ten times as many persons as are born in a single year have had no diphtheria. A number of the more progressive cities and districts have accomplished this in 5 years by immunizing children to the extent of approximately double the number of births each year. After the first 5 years of this intensive work, the community can be kept free from diphtheria if the number of persons immunized encompasses the number of births. The only proviso is that the work be carried on in the preschool group, with the objective that every child be immunized as soon after 6 months of age as is possible.

This experience seems to be sufficiently widespread to be considered a reproducible phenomenon. As a result, the Michigan Department of Health is using as a standard the cities and communities where diphtheria has been made "ancient history" by immunizing each year for a period of 5 years a number of persons equivalent to twice the number of births, and thereafter campaigning for the immunization of all children as soon after 6 months as possible.

FORENSIC BLOOD TESTS

BECAUSE the health department has a laboratory and because the material studied is biological in character, the health officer is often expected to furnish not only laboratory service but expert opinion on many phases of forensic medicine. Such matters are primarily police problems, yet both law and custom have made them a duty of the health department. With many of these examinations the results are sufficiently definite to cause no particular hesitancy in accepting and reporting them, but when blood is involved, the health officer as an expert witness finds himself in difficulty unless he has had considerable experience and is more or less familiar with the literature on this subject.

The so-called blood tests are of two kinds, those to determine the kind of blood in evidence, and those concerning paternity. The technic of both is sufficiently well known and perfected, although with each the greatest care is necessary to prevent errors and to secure controls. If there is any popular opinion about these tests it is that with the first the technic is involved and the interpretation simple, while in the second (paternity tests—involving blood grouping) the technic is simple and the interpretation difficult. The literature, however, reveals the fact that in any case the method is by far the more significant. In attempting to determine the source of an unknown blood specimen, the method of doing that particular test is most important. In so far as paternity tests are concerned, the technic upon which the theory of inheritance itself rests must be taken into account.

If there were no questions of technic there would be little difficulty in determining the correct theory of inheritance.

The methods for performing precipitation tests upon blood the source of which is to be determined are well described in numerous textbooks of serology and forensic medicine. It is not necessary to consider this question further, except to add that Lattes (1927)[1] reported a type of investigation which may develop sufficiently to give much greater value to such tests. This investigator introduced a method for determining the group of the unknown blood in cases where it proved to be of human origin. Thus it may soon be possible to exclude certain individuals from connection with a given investigation or more definitely to involve another.

It is in testifying to paternity that the health official finds the most uncertainty and hence the greatest difficulty. The whole problem has been reviewed by Snyder (1927). It is concerned chiefly with the question of method of inheritance of the Mendelian factors. The fact that blood groups are subject to Mendelian inheritance is generally accepted, but there remains the problem as to whether two pairs of independent Mendelian factors (iso-agglutinogens A and B dominant to their iso-agglutinins a and b) or a series of three multiple allelomorphs (A and B dominant and O recessive) are inherited. In so far as the first three groups O, A, and B (or I, II, and III Jansky) are concerned the possibilities are identical regardless of which of the two theories is accepted. When either parent is of group AB (IV Jansky), however, the interpretation depends upon the theory accepted.

According to Snyder the theory of multiple allelomorphs is confirmed by the facts, yet for medico legal purposes it would seem unwise to accept this premise until it has been more definitely estab-

TABLE I

RESULTS OF BLOOD GROUP CROSSINGS COMMON TO BOTH THEORIES

Mating	Offspring
O + O	O
O + A	O, A
O + B	O, B
A + A	O, A
B + B	O, B
A + B	O, A, B, AB

lished. On the other hand, the results, with which both theories accord, are sufficiently proved to warrant their legal application. As a matter of fact in certain countries, notably Germany, blood grouping is assigned a definite place in legal procedure, and the qualification of expert witnesses as well as the extent of the value of their testimony

is definitely fixed. It would appear that in the United States blood groupings might be more extensively used as evidence with the understanding that all parties, from judge to witness, accept the more or less tentative value of the report. As a support to other evidence the results of blood grouping are of value. As a proof of an existing condition, it might cause injustice.

TABLE II

MATINGS IN GROUP AB

Mating	Inheritance by dependent pairs	Inheritance by multiple allelomorphs
O + AB	O, A, B, AB	A, B
A + AB		
B + AB	O, A, B, AB	A, B, AB
AB + AB		

To indicate the possibilities in this field, Tables I and II are presented. A more complete summary is given by Snyder,[2] and the work of Furuhata[3] is well worth study.

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FIRST INTERNATIONAL CONGRESS ON MENTAL HYGIENE

AN unusual meeting will occur in Washington, D. C., May 5 to 10. This is the First International Congress on Mental Hygiene. From nearly all European countries, from several South American countries and from Japan and China, delegates will attend.

One reason why this will be an unusual gathering is that, for the first time in history, people who are interested in mental hygiene from many different angles will meet together to discuss common or related problems. There have been meetings of physicians interested in the care and treatment of the mentally sick. There have been gatherings of educators at which mental hygiene was discussed. There have been congresses of both doctors and nurses, with some attention paid to psychological factors in etiology and treatment. There have been meetings of criminologists, in which mental factors as causes of crime were thoughtfully considered. But here all these groups, and many others, will be present. The common interest of these numerous participants will be the recognition that mental and emotional conditions are important with respect both to disease and to conduct, and that teacher, physician, parent, nurse and many others share the opportunity to promote positive mental health as well as to avert nervous and mental disease.

Dr. Haven Emerson wrote some emphatic words about preventive measures in health fields, which apply as forcefully to the field of mental health as to that of physical health:

> May I be permitted to suggest that it takes a higher type of intelligence, a greater faith, a truer sense of perspective, to foresee the approach of disease and protect against it, to see the enemies of health from afar, go out to meet them, outmaneuver them, outflank them, and down them by counter-attack, than to heal or tend existing disease? . . . We have arrived at a point in the organization of our national effort for health where advances in the fields already preëmpted and liberally supported by public opinion and resources must wait for their entire success upon a fair beginning and progress in the most delicate and difficult and yet the most promising undertaking of all—the prevention of nervous disorders and mental defects.

Health officers do not always see clearly what function they have in relation to mental hygiene. Some specific suggestions from Dr. Frankwood E. Williams, medical director of the National Committee for Mental Hygiene, bear on this question:

> In considering, therefore, the future development of organized mental hygiene work in this country looking to the prevention of nervous and mental disorder, of delinquency, social inadequacy and dependency, it is apparent (1) that the public health officer in his epidemiological work contributes directly and importantly to one phase of mental hygiene work; (2) that in his attack upon the incidence of syphilis and his campaigning for the adequate, early treatment of those infected with syphilis, he contributes again in a very direct way to an important aspect of mental hygiene; (3) that in his campaign of education for the maintenance of better physical health generally, he contributes to that part of mental hygiene concerned with the prevention of nervous and mental disorders due to physical deterioration; (4) that the prevention of those disorders, personal and social, which are dependent upon the emotional and intellectual qualities and training of the individual, does not lie clearly in any one professional field, such as that of the public health officer, but must be accomplished through the professional coöperation of various groups, particularly those who have to do with the activities of children.

Every day the work of the health officer, the general practitioner, and the nurse is made easier and more effective because their patients, their patients' families and the communities in which they labor are intelligent and coöperative. Mental hygiene aims at intelligence and coöperativeness on the part of all men. To physician and nurse the issues of mental health, mental illness and mental invalidism are vital. We are sure that the proceedings of this Congress will prove interesting to our readers; some doubtless will attend, others will read the published reports.

President Hoover has accepted the position of Honorary President of the Congress.

NOTE: Information about it may be obtained from John R. Shillady, Administrative Secretary, 370 Seventh Ave., New York, N. Y.

Panorama of the Business Section

HISTORY OF FORT WORTH

VAST changes have been wrought in most American cities during the past thirty years, but in few have these changes been more spectacular and revolutionary than in Fort Worth.

The census of 1900 showed a total population of 26,688. The tallest building in the city was eight stories in height. But Fort Worth was served by an electric street railway, having electrified its lines in 1888, the first American city to do so.

If the town was small, it contained big men. They were truly giants in those days. Living on the frontier, far from the centers of population, they were fully impressed with the importance of adequate transportation. At tremendous sacrifices they raised bonuses of cash and lands that by 1900 had brought to Fort Worth the Texas & Pacific, The Fort Worth & Denver City, The Gulf, Colorado & Sante Fe, The Missouri, Kansas & Texas, The Houston & Texas Central, The Fort Worth & Rio Grande, The St. Louis-Southwestern, and The Chicago, Rock Island & Gulf railroads. Fort Worth became and has remained the most important railroad center southwest of Kansas City.

It was the foresight of the pioneers in reaching out for the railroads that made possible the tremendous growth that Fort Worth has experienced. With a preferential trade territory in West Texas that is larger than the states of Illinois, Indiana and Ohio combined, Fort Worth had lagged for the reason that distances were so great and the population of her territory so thinly spread that it was an unprofitable area to serve.

But the turning point had been reached. In 1902 the Armour, Swift, and Libby, McNeill & Libby packing houses were built, representing an investment of more than $10,000,000. They became the largest industrial group in the Southwest. With the stockyards company, the horse and mule dealers, livestock commission men and allied industries they today employ more than 5,000 persons.

The building of the packing houses brought a great influx of new popula-

Fort Worth, Texas

THE 59TH ANNUAL MEETING CITY

tion and lent a stability to the community, making it the center of the packing industry for the Southwest. Between 1900 and 1910 Fort Worth's population increased from 26,688 to 73,312.

The outstanding event of the next decade in Fort Worth's history was the establishment in 1917 of Camp Bowie, on the western boundary of the city. At the same time Talliaferro, Barron and Caruthers flying fields were located within a 14-mile radius of Fort Worth. In addition to the American aviators at the fields there were hundreds of members of the Royal Flying Corps of Canada.

Hard upon the heels of the establishment of the army camps came the news of the discovery of oil at Ranger, succeeded a few months later by a discovery of a new field at Burkburnett. These discoveries marked the beginning of the great West Texas fields which doubtless contain the largest oil reserves in the known world.

Meanwhile the cutting up of the great ranches of West Texas had begun. Wheat fields in the Texas Panhandle produced so bountifully that with the high prices current in 1919 many farms were paid for out of the one crop. Cotton growing had been extended westward and in the South Plains the government tests had shown that cotton could be produced more cheaply than in any other section of the Cotton Belt. The sorghum grains, Kaffir corn, Milo maize and Feterita produced so bountifully throughout West Texas that the farmers were assured of a feed crop which made stock raising and feeding profitable.

All of these factors combined to bring a great movement of agricultural population into West Texas about 1920. Since that time the population of the area has increased at the rate of 100,000 a year. A recent survey of the population of thirty typical West Texas cities showed an average increase of 200 per cent since 1920.

West Texas is now producing new wealth to the value of more than three-quarters of a billion dollars a year. Petroleum and natural gasoline contribute

$265,000,000; cotton and cotton seed $175,000,000; livestock $125,000,000, and grain $100,000,000.

Fort Worth, the gateway to West Texas, its supply point and its market place, has naturally reflected this growth. Credited with a population of 106,482 in the 1920 census, a recent survey indicates a present population of 202,316. It is a city of skyscrapers, pleasant parks, fine schools and colleges, and comfortable homes.

Texas Hotel,

Headquarters for A. P. H. A. Meeting

Some idea of its activities may be gained from the fact that in the city and county there is now under way a construction program involving $60,000,000.

Bids have been called for by the Texas & Pacific Railway for a new passenger station and terminal warehouses that will cost $8,000,000. A good roads program in Tarrant County, of which Fort Worth is the county seat, involves the expenditure of $10,000,000. Two dams on the West Fork of the Trinity River will cost $6,500,000. The reservoirs created will give Fort Worth a water supply sufficient for 1,000,000 people and make possible the irrigation of 52,000 acres of land.

Probably the most constructive step taken by the City of Fort Worth during its recent history was the adoption of a new charter in 1925. Theretofore the city hall had been a rendezvous for politicians. But the charter provided for the Council Manager form of government. At the solicitation of voters, nine of the outstanding business and professional leaders of the city agreed to accept nominations as councilmen. They were elected and have since been returned at the two succeeding municipal elections. The only changes that have occurred have come through death or resignations.

The council chose a city manager of outstanding ability. Every department of the city government was reorganized. Public improvements that have cost many millions of dollars were undertaken and approved by the voters, who felt that they were getting the full worth of the money expended. Streets have been widened; underpasses provided; storm sewers built; water and sewer mains extended; white ways installed.

Absolute confidence in the integrity of the city government has resulted in the voters of Fort Worth standing behind every proposal for municipal improvements. A thoroughly modern metropolis, humming with industry and athrill with prosperity, has supplanted the " cow town " of thirty years ago.

ASSOCIATION NEWS

A. P. H. A. Represented at Latin-American Medical Congress

UPON the invitation of officials of the Mexican Federal Health Department, Homer N. Calver, Executive Secretary of the American Public Health Association, and members of the Texas State Health Department staff attended sessions of the Latin-American Medical Congress held in Mexico City during the week of January 13. Delegates from the various states of Mexico and Central America, as well as South American republics, participated in the meeting. Also representatives of the American Public Health Association and the U. S. Public Health Service attended.

A joint conference was arranged for members of the Texas Health Department staff, the Federal Health Department of Mexico, the U. S. Public Health Service, and the American Public Health Association to discuss the importance of mutual coöperation in matters of sanitation along the Texas-Mexico border.

Preliminary plans were laid for a large delegation of Mexican health workers to attend the A. P. H. A. meeting at Fort Worth next October. Plans were considered also for delegates at that meeting to make a short visit to Mexico City.

NEW MEMBERS

Health Officers Section

H. W. Darby, M.D., St. Louis Park, Minn., Health Officer

Wilbur A. McPhaul, M.D., Charlotte, N. C., City-County Superintendent of Health

Benton C. Wilson, M.D., Medford, Ore., Health Officer

Richard Felton, M.B., B.S., Victoria, B. C., City Medical Health Officer

Martin H. Jensen, M.D., Sweetwater, Tex., Director, Nolan County Health Unit

Griem L. Johnson, M.D., Harrodsburg, Ky., County Health Officer

Thomas C. Watson, M.D., Benton, Ark., City Health Officer

Henry P. Dengler, M.D., Summit, N. J., Health Officer

Frank F. Sowers, M.D., Fairmont, W. Va., Health Officer, Marion County

Lucien T. Lee, M.D., Selma, Ala., City and County Health Officer

H. Jackson Davis, M.D., Dr.P.H., New York, N.Y., Recently Deputy District State Health Officer

George S. Eveleth, M.D., Little Falls, N. Y., Health Officer

Robert J. Gillespie, San Benito, Tex., County Health Worker

Clyde W. Beson, M.D., Oklahoma City, Okla., State Health Commissioner

George H. Sumner, M.D., Asheboro, N. C., County Health Officer of Randolph County

Matthew E. Soller, M.D., Ypsilanti, Mich., Health Officer

Gordon P. Jackson, M.B., Toronto, Ont., Medical Officer of Health

Frank L. Rose, M.D., Saginaw, Mich., Health Officer of Saginaw County

Laboratory Section

Richard P. Fowler, B.A., Oberlin, O., Bacteriologist, Lorain County District Board of Health

Irving L. Dahljelm, Highland Park, Mich., Bacteriologist and Chemist, Department of Health

George D. Cummings, B.S., Lansing, Mich., Bacteriologist, Department of Health

M. E. Alpers, Dover, N. J., Bacteriologist, Department of Health

Paul J. Beard, Ph.D., M.S., Stanford Univ., Calif., Instructor in Sanitation, Bacteriology Department, Stanford University

Vital Statistics Section

Alice M. Hill, A.B., New York, N. Y., Statistical Field Secretary, National Tuberculosis Association

Public Health Engineering Section

Andrew M. Jensen, B.S., Fresno, Calif., Commissioner of Public Works

Industrial Hygiene Section

Byron E. Neiswander, M.D., Columbus, O., Chief, Division of Industrial Hygiene, Department of Health

Ezra Kagan, Kharkhov, Ukraine, Director of State Institute for Pathology and Hygiene of Labor (Assoc.)

Food, Drugs and Nutrition Section

E. R. Quackenbush, B.S., St. Paul, Minn., Secretary, Twin City Unit, National Dairy Council

Thomas Moore, B.V.Sc., Guelph, Ont., Veterinary Inspector, Department of Agriculture

Child Hygiene Section

William Weston, M.D., Columbia, S. C., Chairman, South Carolina Food Research Committee (Assoc.)

Elizabeth S. Horton, B.S., Weston, Mass., Department Medical Coöperation, Earnshaw Sales Co. (Assoc.)

Mrs. C. A. VerNooy, A.B., Athens, Ga., Chairman, Georgia May Day Committee (Assoc.)

Elizabeth L. Clark, M.D., Cincinnati, O., School Medical Examiner

Mrs. L. C. Ross, Ellis, Kans. (Assoc.)

George F. Badger, Detroit, Mich., Assistant Epidemiologist, Department of Health

James Houloose, M.D., Long Beach, Calif., Supervisor, Public School Health Service

Public Health Education Section

Deborah H. Veneklasen, R.N., Midland, Mich., Chief Nurse, Midland County Health Unit

Florence F. Goodrich, B.A., Marquette, Mich., Instructor in Public Health Education, Northern State Teachers College

J. Paul Frantz, M.D., Clearfield, Pa., Chief of Chest Clinic, Department of Health

Lillian M. Bushong, R.N., Asheville, N. C., Resident Nurse, Normal School

Sarah G. Mayer, A.B., Washington, D. C., Research Worker in Public Health Education

Lucia A. Kendall, B.S., New Haven, Conn., Assistant Health Education Secretary, Y. W. C. A.

Arthur E. Benjamin, Minneapolis, Minn. (Assoc.)

Thomas A. Gardner, D.D.S., Iowa City, Ia., Director, Bureau of Dental Hygiene, State University of Iowa

Public Health Nursing Section

Lydia W. Reitz, R.N., Saginaw, Mich., Visiting Nurse, Metropolitan Life Insurance Co.

Nell Peterson, Sioux Falls, S. D., School Nurse

Mary E. Hoover, Ypsilanti, Mich., School and City Public Health Nurse

Margaret G. Arnstein, R.N., Yorktown Heights, N. Y., Public Health Nurse, Northern Westchester District Nursing Association

Esther M. Gustafson, R.N., San Luis Obispo, Calif., Supervising Public Health Nurse, Department of Health

Kate M. Ritter, R.N., Riverside, Calif., Chief Nurse, Sherman Institute, U. S. School for Indians

Lauretta Hamlen, R.N., New York, N. Y., School Nurse, Department of Health

Ellen M. Johnson, P.H.N., San Francisco, Calif., Supervising Nurse, Department of Health

Margueritte Cunningham, R.N., Ft. Worth, Tex., Supervisor of Nurses

Epidemiology Section

Gaylord W. Anderson, M.D., Brookline, Mass., Epidemiologist, Massachusetts Department of Health

William J. Murphy, M.D., Lansing, Mich., With Bureau of Epidemiology, Department of Health

Donald E. Camp, M.D., Midland, Mich., County Health Officer

Russell B. Howard, M.D., Grayling, Mich., Director, County Health Department

Carleton Dean, M.D., Eaton Rapids, Mich. (Assoc.)

Unaffiliated

Joseph W. Fuller, D.D.S., Jacksonville, Fla., Charge of Dental Clinic, Department of Health

Jacobo S. Armijo, Albuquerque, N. Mex., Sanitary Inspector, Bernalillo County Health Department

George W. Dick, D.D.S., Sumter, S. C., Member, Executive Committee, State Board of Health

William H. Beatty, New York, N. Y. (Assoc.)

Sustaining Members

Pease Laboratories, New York, N. Y.

Mrs. Frederick Peterson, New York, N. Y.

DECEASED MEMBERS

William Royal Stokes, M.D., Baltimore, Md., Elected Member 1899, Fellow 1922

A. W. Akerley, M.D., Somers, Mont., Elected Member 1917

Emile Berliner, Washington, D. C., Elected Member 1919

Frederick William Browning, M.D., Hayward, Calif., Elected Member 1920

Joseph S. Cohn, M.D., Chicago, Ill., Elected Member 1918

J. E. Farr, M.D., Eau Claire, Wis., Elected Member 1924

Arthur Rigby, Winnipeg, Man., Elected Member 1921

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Diphtheria Problem—Diphtheria, scarlet fever, measles, and whooping cough are primarily diseases of childhood although the first two mentioned are frequently met with at other ages. The diphtheria bacillus has been found in 12 per cent of new-born babies but in 60 per cent of such instances the mother was infected at the same time as the child.

Particular attention is drawn to mild or "missed" cases which determine in individuals an immunity which is considered to be natural but which is in reality due to an unobserved mild attack.

Diphtheria morbidity began to decline in most European countries around 1894 before the general use of antitoxin, although in several countries the incidence remained at a fairly constant level. After this decline the morbidity has remained almost stationary in the majority of countries. The fall in the amount of the disease since 1895 may have been due in part to the general improvement of living conditions among the poorer classes. Epidemics of diphtheria in Europe during the middle of the last century may, however, have produced a natural immunity in the population. It is a well known fact that a number of epidemic illnesses may confer immunity on a large section of a population resulting in the prevalence of milder forms of the disease. When antitoxin was discovered (1895–1896) the disease had only a slightly higher morbidity than is the case at the present time.

On the other hand, the mortality from diphtheria has diminished considerably—in Norway from 79.8 per 100,000 inhabitants in 1894 to 25.2 in 1895 and 17.0 in 1896; in the Netherlands from 33.2 in 1894 to 20.7 in 1895 and 19.6 in 1896. Similar mortality drops occurred in Germany, Denmark, Scotland, France and Italy. In England prior to the introduction of antitoxin the mortality had been much lower than in some of these continental countries and the reduction since that date has not been so pronounced. In fact the English mortality during recent years (1925 to 1927) has been higher than that of the other countries.

A high proportion of cases with paralysis has been reported during the last three years. The case mortality has been high and has varied among different races. Fletcher examined 276 school children, of whom 172 were Malays and 104 Chinese, in the Federated Malay States. The Schick reaction was negative among the Chinese and Hindus in 76 per cent of cases, while among Malays the test proved negative in 91 per cent of cases. American workers have found a high per cent of natural immunes in the Philippines.

The relative absence of diphtheria in the tropics can be attributed to the large number of immune persons. Perhaps such immunity is due to widespread epidemics in past centuries which were not reported. Park and Zingher have shown that Italian children are more immune than American. This is attributed rather to difference of social state, as the Italian born children belong to the poorest classes of America.

The natural immunity which exists among tropical peoples may possibly be due to the same causes as produce immunity among the

poorer classes in the United States and in Europe. Such causes appear to be of a social rather than a racial order, because the great majority of natives of tropical countries belong to the poorer classes. The spread of epidemics of diphtheria among the peoples living under conditions of over-population and lack of sufficient material supplies has led to the production of an immunity which is now termed natural.

Active immunization against diphtheria is now practiced in three principal ways, (1) toxin-antitoxin, (2) anatoxin, and (3) vaccines. Immunization by vaccination, by mouth and by friction with an ointment containing bacteria and toxoid has been attempted. (The author describes results reported for each method.)

The value of active immunization against diphtheria, practiced according to recognized methods, is undoubted. The control of diphtheria mortality, which during the last few years has suffered a partial check, appears now to have taken a new form, and the time is perhaps not far off when lasting progress is assured.—General Review of the Diphtheria Problem in Recent Years, *Month. Epidem. Rep.*, League of Nations, June 15, 1929.

Cancer Studies—For the past 6 years Detroit has had a "cancer week" to teach the public early symptoms and the need of early diagnosis and treatment. During these special weeks, 7,767 individuals have presented themselves for examination. Four per cent have been found to have cancer, and an additional 12 per cent have had precancerous conditions requiring attention.

In 1927 the Detroit Department of Health established a Division of Cancer Control with an annual appropriation of $16,000. The personnel included 3 part-time physicians, 2 public health nurses and 1 clerk. Starting with the death certificate an epidemiological study has been made of every cancer death from the onset of symptoms to the diagnosis, the record of treatment, and subsequent course after treatment. A Central Follow-up Registry has been established for living cases which are voluntarily reported by private physicians and hospitals. These follow-up histories are being made available to the profession through the county medical society.—Harry C. Saltzstein, Cancer Educational Activities, *City Health*, Detroit Health Dept., Nov.–Dec., 1929.

LABORATORY

C. C. YOUNG, D. P. H.

REPORT OF LIGHT TYPHOID OUTBREAK IN WHITTIER, CALIF., WITH SPECIAL REFERENCE TO THE LABORATORY FINDINGS

LEONARD HEDDICK

Murphy Memorial Hospital, Whittier, Calif.

IN the latter part of October, 1929, a light outbreak of typhoid fever occurred in Whittier, Calif. The first 3 cases were diagnosed and reported simultaneously to the Health Officer, Dr. F. G. Crandall, who immediately started an investigation. It was found that all of them consumed raw milk from the same dairy company, which obtained its raw milk from two dairies. Inquiry at the distributing plant revealed that these patients used milk from one of these. Dr. Crandall ordered all milk from this dairy to be pasteurized until further notice. The source of infection was found and preventive measures instituted in less than 24 hours.

At the suspected dairy there were no cases of illness, but one of the milkers had gone home sick October 5, and had not returned. He was traced to his brother's home in Artesia, a few miles away, and was found to be convalescing from a recent illness diagnosed by his family physician as "intestinal flu." Typhoid had not been suspected and no laboratory tests had been made. This man was about to start work in the dairy of his brother with whom he had stayed during his illness. A Widal showed complete agglutination in 1–320 dilution, partial at 1–640, para A and B negative. Eight stool specimens were negative.

Dr. Crandall could obtain no clue as to where this milker got his infection, but felt satisfied that he was the source of the outbreak. There were 7 cases, 6 described here, the 7th being a relative of the milker from a distant city who visited him during his illness and later came down with the disease. Five of the cases consumed milk from the dairy implicated, the 6th being a child living in the same house with the milker. Five were young children, 1 a boy of 17, and 1 a man of 30 years of age.

This milker left the dairy October 5, and the following cases cropped up about 14 days after he left—the approximate incubation period.

Case No. 1—Widal negative, feces negative. Widal repeated after 2 days negative. Blood culture positive in 24 hours. Blood culture again positive in 24 hours after 4 days.

Case No. 2—Widal 1–40, only. Blood culture taken at the same time positive after 3 days incubation.

Case No. 3—Widal negative. Blood culture taken same time positive.

Case No. 4—Feces negative. Widal 16 days later positive 1–320 dilution.

Case No. 5—Widal positive 1–320.

Case No. 6—Two feces examinations negative. Widal positive 1–160, partial 1–640.

Case No. 7—A 2-year old child in the home of ill milker. Widal negative. Blood culture positive in 18 hours for Gram-negative motile bacilli. Feces 9 days after positive blood culture negative; on 10th day positive. The organism from this specimen showed rapid

and high agglutinating properties, being completely agglutinated in 1–16,000 dilution, incubation 30 minutes. The milker's serum agglutinated this organism up to 1–160.

SUMMARY

The offending organism was recovered from the blood in 4 of the 6 cases tested, and once from the feces in 4 during active stage of the disease. Four of these were confirmed by blood culture. The Widals in these were, 2 negative, and 2 positive in 1–40 dilution, only, there not having been sufficient time for the patients to develop specific agglutinins. The organisms from the blood were proved to be *B. typhosus* on sugars and by agglutination with anti-serums. The earliest positive blood culture was 6 days after onset of symptoms, emphasizing the value of such cultures in early typhoid bacteremia.

THE STOLTENBERG DIFFERENTIAL STAIN FOR DIPHTHERIA BACILLI

HELEN H. OWEN AND MARIE BAND

Division of Laboratories and Research, New York State Department of Health Branch Laboratory, New York, N. Y.

A DIFFERENTIAL stain for diphtheria bacilli, recommended by Stoltenberg,[1] has been compared with Loeffler's alkaline methylene blue stain and Albert's stain for polar bodies.

The results of the three procedures were first studied with pure cultures, the series including 25 cultures of *B. diphtheriae*, 10 of *B. hofmanni*, and 7 of *B. xerosis*. Forms with polar bodies predominated in the cultures stained with Stoltenberg's or Albert's stain, whereas the predominating forms stained by Loeffler's method were solid or banded. No difference was noted in the morphology of *B. hofmanni* when stained by the three methods; all were solid or banded forms and no granules were observed. The cultures of *B. xerosis* showed forms with polar bodies as well as banded and solid forms with all three stains.

One hundred nose and throat cultures received for routine examination were stained by the three methods and morphologically characteristic diphtheria bacilli were found in 45 with all of the stains. It was noted that young cultures of *B. diphtheriae* (incubated at 37° C. for from 6 to 12 hours), which with Loeffler's stain appeared as solid or banded forms, showed polar bodies with Stoltenberg's stain. The same cultures incubated for 24 to 48 hours showed polar bodies when stained with Loeffler's alkaline methylene blue. The morphology of *B. hofmanni* remained unchanged throughout the long incubation period and these organisms were so faintly stained that *B. diphtheriae* could be easily differentiated.

The formula and procedure for Stoltenberg's stain are as follows:

Malachite green	0.250 gm.
Toluidin blue	0.050 gm.
Haematoxylin or logwood extract	0.010 gm.
Distilled water	100.0 c.c.
Acetic acid	3.0 c.c.
Ethyl alcohol	3.0 c.c.

Stain for 1 minute. Then wash the preparations with tap water and dry. The granules appear red and the body green.

The stain is not recommended as a substitute for Loeffler's alkaline methylene blue stain for routine use as it does not as satisfactorily differentiate *B. diphtheriae* from *B. xerosis*, and other nonpathogenic forms with polar staining. It is recommended as a valuable confirmatory stain, however, since it aids in the differentiation of *B. diphtheriae* from *B. hofmanni*, especially in young cultures, and is a very short and simple procedure.

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2. Wadsworth, A. B. Standard Methods of the Division of Laboratories and Research of the New York State Department of Health, 1927, pp. 16, 19, 24, 27, Williams & Wilkins.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Tuberculosis in Early Childhood—This survey included the total deaths from tuberculosis in England and Wales for 1927. The period especially studied was the first 5 years of life, and the amount of tuberculous disease in all its forms at this time was compared with similar succeeding periods. The number of deaths, about 3,000 in the first period, birth to 5 years, exceeded that in the later period of childhood and puberty. In adolescence and throughout the prime of life, the figures were about or exceeded the 4,000 mark. The first phase of tuberculosis is therefore, as regards fatal disease, easily the most important of the whole period of childhood.

The relative prevalence of clinical types of tuberculosis was also studied through the medium of the tuberculosis deaths in England and Wales for 1927. Only 3 types were chosen, meningeal, respiratory and abdominal. These do not constitute the whole of tuberculosis at the early period in childhood, but form the greatest and most important part of it. Meningitis easily took first place in the number of deaths for the first 5 years; and the total for this period was far greater than for any other period. Abdominal tuberculosis also caused far more deaths at this period than at any later period. The number of deaths from pulmonary tuberculosis practically equalled that from abdominal tuberculosis in the first period. In the first 5 years of life, in England and Wales, the deaths from tuberculous meningitis were 3 times greater than those from pulmonary and from abdominal tuberculosis.

A study of 254 cases of tuberculosis admitted to the Royal Edinburgh Hospital for Sick Children during the past 8 years showed that 181 cases occurred under 5 years of age. Of the 91 cases of meningeal tuberculosis, 73 occurred under 5 years. Death resulted in all cases. Post-mortem examination was made in 51 cases and the primary lesion revealed in all but 2. In this group of 181, there were 27 cases of pulmonary tuberculosis with 19 deaths. Pulmonary tuberculosis is very difficult to diagnose in the period of infancy because it assumes a variety of forms. In the first 5 years, there were 81 cases of abdominal tuberculosis with 43 deaths. Throughout northern England and Scotland, abdominal tuberculosis is a grave peril, being caused by infected milk in most cases.—*Brit. M. J.*, 2: 655–658 (Oct. 12), 1929.

VITAL STATISTICS FOR 1929

Metropolitan Life Insurance Co.—Continued progress of the American and Canadian public health movement is shown in the mortality records for nearly 19,000,000 industrial policy holders of the Metropolitan Life Insurance Company during 1929. There occurred 8.7 deaths per 1,000 lives, a figure identical with that for 1928. The outstanding public health fact of 1929 was the reduction of the tuberculosis death rate to a new minimum. The death rate now stands at 85.6 per 100,000. The previous low point was 90.6, recorded in 1928. The outlook at the present time is that the downward swing of the death rate will continue, and 10 years from now the tuberculosis death rate among these wage earners will be well on its way toward 40 deaths per 100,000.

Another new low point was reached in 1929, in the mortality rate for typhoid fever. The death rate (2.3 per 100,000) marks a decline since 1911 of 89.9 per cent.

The death rate for the four principal communicable diseases of childhood (measles, scarlet fever, whooping cough and diphtheria) in 1929 was only 16.3 per 100,000, or 14.2 per cent below the previous minimum of 19.0, recorded in 1928. The outstanding item in this group is diphtheria, with a 1929 death rate of only 8.5 per 100,000, as compared with 9.5 (the previous minimum) in 1928. Scarlet fever duplicated its minimum death rate of 1928 (2.6 per 100,000). There was a small rise in the mortality from whooping cough.

The death rate for diarrhea and enteritis reflects closely the advancing standards of domestic and civic hygiene. The mortality rate for this cause has now declined to 7.8 per 100,000—or almost to one-quarter of the figure registered 18 years ago.

One of the most encouraging developments in 1929 was the recording of a new minimum death rate for diseases and conditions incidental to pregnancy and childbirth. The rate, 13.5 per 100,000, was lower by 4.9 per cent than the previous minimum of 14.2 in 1928.

The suicide death rate of these insured wage earners was 8.5 per 100,000 in 1929, which is identical with that for 1928, but higher than for any other year since 1917. The homicide death rate declined slightly.

For certain diseases and conditions the 1929 mortality record was somewhat unfavorable. The early months of the year experienced the heavier part of the wave of influenza and pneumonia which began in November of the preceding year. The heart disease death rate, in 1929, was 146.1 per 100,000 as compared with 144.4, the previous maximum, in 1928. The rise in the rate for cardiac conditions in 1929 is chargeable almost entirely to the effects of the influenza epidemic, which hastened the deaths of many thousands of persons suffering with chronic diseases.

The cancer death rate continued its slow, persistent increase to a new high point. The 1929 mortality rate was 77.3 deaths per 100,000 policy holders as compared with 77.0 in 1928. The most recent investigation into cancer mortality by the Metropolitan Life Insurance Company has developed certain important aspects of the upward trend of the death rate, and has shown that the gravity of the cancer problem is much greater than it was only 5 years ago.

The previous maximum death rate for diabetes was 17.9 in 1928, and the rise in 1929 amounted to 2 per cent. The diabetes mortality rate has now been increasing continuously for 5 years.

The mortality rate for accidents rose

slightly in 1929. This was due almost entirely to the alarming increase in automobile fatalities, although there were also more deaths than in the preceding year from falls and machinery accidents. The 1929 death rate for automobile accidents was 20.9 per 100,000, a rise of 12 per cent in a single year.

Acute and chronic alcoholism caused 641 deaths of policy holders during 1929, with a death rate of 3.4 per 100,000. This marks a slight increase over the record of 1928 when there were 599 deaths and a death rate of 3.3 per 100,000. Deaths from cirrhosis of the liver, which are largely of alcoholic origin, number 1,208 in 1929, as compared with 1,217 in 1928; the death rate declined to 6.5 per 100,000, from 6.7, in 1928.

The latest available mortality figures for the general population of the United States relate to the year 1928. Between 1911 and 1928 the death rate for the general population declined only 11 per cent, as compared with a drop of 31 per cent among Metropolitan industrial policy holders. In 1928, the crude mortality rate of insured wage earners was lower than that of the general population (of comparable ages) by 3.2 per cent.

For the communicable diseases of childhood, the corresponding figures are 68 per cent for insured wage earners and 62 per cent for the general population. The greater improvement which has obtained since 1911 in the death rate among Metropolitan industrial policy holders, as compared with the general population, has come largely from the company's activities in the fields of social service and public health among the many millions of insured people.—New Low Records for Mortality in 1929, *Stat. Bull.*, 11: 1–10 (Jan.), 1930.

Milwaukee, Wis.—Health conditions in the city of Milwaukee were on the whole very satisfactory, in spite of the fact of the influenza epidemic and the most severe measles epidemic in the history of the Health Department. The general death rate for the year was 10.5 compared to 10.9 for the previous year, and was somewhat lower than the average for the last 5 years. Infant mortality was 72 per 1,000 live births compared with 70 for 1928. The principal cause of deaths in babies over 30 days old was pneumonia, 162 babies dying from this cause during 1929. There were 886 infant deaths under 1 year, 12,232 live births and 327 stillbirths, compared to 846 infant deaths under 1 year, 12,120 live births and 375 stillbirths in 1928. There were 13,198 cases of measles with 25 deaths reported during the year. Whooping cough showed the next greatest increase with 3,806 cases and 40 deaths. All other contagious diseases showed decreases. Tuberculosis with 259 deaths showed an encouraging decrease over 1928 with 292 deaths. Heart disease and cancer showed the usual increase; there were 1,087 deaths from heart disease compared to 997 the preceding year, and 591 deaths from cancer compared to 578 the year before. There were 108 automobile deaths compared to 124 for last year. Deaths from alcoholism increased from 21 in 1928 to 27 in 1929. There were 5 deaths due to carbon monoxide poisoning.—*Milwaukee Month. Health Bull.*, 19: 2–5 (Feb.), 1930.

New Haven, Conn.—The estimated population of New Haven for 1929 was 190,847. During the year, there were 2,181 deaths, giving a death rate of 11.4. The most striking feature was the marked reduction in the infant mortality from 53 in 1928 to 42.4 in 1929. The birth rate dropped again to a new low point of 14.6. Among the 10 leading causes of death, heart disease still held the lead; tuberculosis was in 5th

place, and deaths from auto accidents ranked 8th. The tuberculosis death rate of 49.25 showed a substantial drop from the previous year. There were 6 resident cases of smallpox during the year. The substantial control of diphtheria was striking. There was 1 less case in 1929 than in 1928, and there were only 2 resident deaths as against 6 for the previous year.—*New Haven Month. Health Bull.*, 57: 2–7 (Jan.), 1930.

Victoria, British Columbia—The population of Victoria according to the 1928 census was 43,750. The death rate for 1929 was 13.1 per 1,000 population as against 13.9 for the preceding year. The birth rate was 18.1 for 1929 and 20.1 for 1928. Infant mortality decreased from 42.2 per 1,000 live births in 1928 to 40.3 in 1929. The latter was 37.9 for whites and 72.7 for Asiatics. With the exception of a somewhat greater summer incidence of measles and mumps, 1929 was light in communicable diseases. There were 57 cases of pulmonary tuberculosis with 25 deaths. —*Annual Report for 1929.*

Lincoln, Neb.—A study of the mortality records for 1929 shows an increase of 43 deaths over the previous year, 29 of which are accounted for by an increase of organic heart disease. Deaths from nephritis show a decrease of about 14 per cent. Mortality from malignant disease is about on a level with preceding years. There has been no further decrease in deaths from puerperal infections. The increased mortality has occurred chiefly in the age group 5 to 25, which shows an increase of 55 per cent, and the old age group, 65 and over. There were 25 less births in 1929 than in 1928 and 92 less than in 1927; a decrease of 6.5 per cent in 3 years. There was a much larger proportionate decrease in stillbirths; 34 per cent over the same period.—*Annual Health Report.*

Buffalo, N. Y.—Buffalo had an estimated population of 555,800 for 1929. The annual death rate was 13.8 per 1,000 compared with 13.4 in 1928. There were 11,685 births corresponding to a rate of 21.0 per 1,000 against 21.7 in 1928. Infant mortality decreased from 74.0 per 1,000 live births in 1928 to 66.1 in 1929. There were increases in the number of deaths from organic diseases of the heart from 1,335 in 1928 to 1,749 in 1929; cancer, 666 to 678; pneumonia, 419 to 501; automobile fatalities, 150 to 196; diabetes, 97 to 119; and suicides, 61 to 72. Noteworthy among decreases were pulmonary tuberculosis, 404 to 390 in 1929; other forms of tuberculosis, 90 to 75, and nephritis, 254 to 251. The number of cases of measles declined from 6,502 in 1928 to 975 in 1929.—*Buffalo Month. San. Bull.*, Dec., 1929.

Boston, Mass.—The Boston Department of Health announces that the estimated birth rate for 1929 was 22.7 per 1,000 population, as against 23.5 in 1928. The death rate from all causes was 14.5, the same as in 1928. There was an infant mortality rate of 68 per 1,000 live births, as against 77 in 1928. Among the leading causes of death were 2,230 from heart disease, 1,245 from cancer, 1,411 from pneumonia, and 574 from pulmonary tuberculosis.—*Boston Month. Health Bull.*, Jan., 1930.

Maryland—During 1929 the birth rate in Maryland was 18.5 per 1,000 population. This is the lowest recorded since 1912. The death rate from all causes for the year was 13.4. There was an infant mortality rate of 79 per 1,000 live births. The rate in Baltimore was 73 and in the counties it was 85. The leading causes of deaths were heart disease with a rate of 233.2 per 100,000 population; influenza and pneumonia with a rate of 178.2; nephritis 148.4; cancer and other malignant tumors 108.3; tuberculosis, all

forms, 104.2; and cerebral hemorrhage 100.3.—*Maryland Month. Bull.*, Feb., 1930.

Newark, N. J.—The Health Department of Newark has announced in a preliminary statement that there have been fewer infant deaths, and a reduced mortality from cancer, Bright's disease and nephritis, and puerperal fever in 1929 over the previous year. Both the crude death rate, 11.6, and the adjusted rate, 10.9, per 1,000 were the same as in 1928. The infant mortality rate of 60 per 1,000 live births was one of the lowest ever recorded for the city. Deaths from Bright's disease numbered 254, a figure 44 less than the preceding year. The 471 cancer deaths were 20 fewer than in 1928. Puerperal fever caused 16 less deaths, reducing the rate from 13.3 to 9.8 per 100,000. Deaths from heart disease numbered 1,057, or 55 less than in 1928. The death rate from organic heart disease, 220.2 per 100,000 population, was by far the highest of any rate for special causes. Increases in deaths from apoplexy, influenza, tuberculosis, accidents and suicide were noted. Reported cases of communicable diseases decreased 4,036 during the year to a total of 17,329. Fewer cases of measles accounted for most of this reduction.—*New Jersey Pub. Health News*, 15: 57 (Feb. 14), 1930.

Connecticut—The accumulated birth rate for 11 months showed a very decided drop from 17.5 in 1928 to 15.2 in 1929. The death rate of 10.9 is the same as it was in 1928, which is encouraging because of the influenza outbreak early in the year. For the 11 months of 1929, decided increases were shown for influenza, cancer, diseases of the heart, and diarrhea under 2 years. Noteworthy among decreases were whooping cough, diphtheria, all forms of tuberculosis, diabetes, nephritis, and puerperal diseases. It now seems as if 1929 will show the lowest death rate from diphtheria in the history of Connecticut vital statistics and it is possible that the death rate from tuberculosis will reach a record low.—*Conn. Month. Health Bull.*, Jan., 1930.

Infant Mortality in Bombay—The number of births registered in Bombay in 1928 exceeded that of the previous year by over 2,000; it was more than 3,000 above the annual mean number of births registered in the 10 years, 1918–1927. Calculated on the estimated population for 1928, the birth rate was equivalent to 18.5 per 1,000; the number of live births recorded was the highest since 1866.

The death rate among infants under 1 year was 311 per 1,000 registered births, a figure which contrasts sharply with the calculated infant death rate of 176 per 1,000 for the whole of British India, but it is an improvement on 316, the 1927 rate, and on 474, the annual average in the decennium 1918–1927.—*Brit. M. J.*, 2: 1082 (Dec. 7), 1929.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

Sewage Disposal. The Activated Sludge Process in Operation. Standards of Purity—The activated sludge process is far more likely to supplement than to supersede the older methods. Common mistakes made in connection with its use and the wisdom of not dispensing with filters are considered. It has been found that the purification effected by the activated sludge process is at first very rapid, but it soon slows down, e.g., 60 per cent of the impurities of the Birmingham sewage are removed in the first hour, but it takes 5 hours to remove another 30 per cent.

The quantity of sewage purified by each cu. yd. of filtering material is more than doubled when the sewage has been treated by the activated sludge process instead of merely being passed through a sedimentation tank. Thus, owing to the rapid increase in the population of the drainage district under the Tame and Rea Drainage Board, aeration or flocculation tanks are used between the sedimentation tanks and filters to obviate the necessity of laying down an additional acre of filters each year.

Opinions differ as to the purification standards and nature of tests to be used. Lord Iddesleigh's Commission recommended a common sense standard to be applied in ordinary cases, the dilution afforded by the stream being considered before the application of the standard. With a dilution exceeding 500 volumes, all tests might be dispensed with. No biological standard has been advocated, those proposed or in force relating solely to the chemical qualities of the effluent. The effluent from a sewage works must therefore be regarded as potentially dangerous.—A. J. Martin, *Surveyor*, 76: 366, 1929. (From Papers of Water Pollution Research Board, England.)

Artificial Means of Influencing the Formation of Ground Water in Flat Country—The author considers that it is possible to increase the amount of ground water in a flat country by artificial means at the expense of surface flow-off and evaporation. The seepage of rain through the fine-pored surface layer causes an increase of air pressure in the lower larger-pored stratum, which may increase above the atmospheric pressure and force water to the surface. The author carried out investigations of the growth of this air pressure and of its effect on seepage and the increase of ground water. The pressure in the coarse layer was observed by inserting a pipe carrying a manometer. A method of estimating the amount and increase of ground water is described. It was found that the underground river which flows through Munich only receives some 10 per cent of the precipitation of the district through which it flows. The author suggests that methods for increasing the amount of ground water are: to increase the air drainage in the coarse-pored stratum above the water surface, and to increase the flow of water and the depth of channel. He describes an arrangement for air drainage either by vertical slotted pipes reaching almost through the coarse layer or, if the fine upper layer is thin, by horizontal slotted pipes with vertical pipes to the surface at intervals. This arrangement should be combined with

water intakes (seepage galleries, wells, etc.), and, where necessary for agricultural purposes, with a pressure pipe so that water can be forced to the surface. —Mezger, *Gas- und Wasserfach*, 72: 948, 1929. (From Papers of Water Pollution Research Board, England.)

Water Supply of Hither Pomerania—With its scattered population, Hither Pomerania is almost entirely supplied by single wells. The results of 50 bacteriological and 360 chemical investigations of well waters are summarized; of these 90 per cent were chemically and bacteriologically to be condemned. Of 33 samples of water from dairies, 21 were bacteriologically impure and only 5 were chemically acceptable. Of 16 school well waters, 14 were to be condemned. Of 50 bacteriological tests, 15 were usable, 3 usable under certain conditions, and 32 unusable.

The true underground water in Pomerania lies some 40 meters deep between glacial deposits. Most wells only reach a "surface" underground water, above the latest glacial deposit, which is not cut off from pollution by sewage, etc. Also the building of wells is generally bad. Water supplies for drinking purposes should be taken from the second ground water zone or from one deeper still.—Lensden, F. P., *Z. f. Medizinalbeamte*, 1929, 42, 40; *Gas- u. Wasserfach*, 1929, 72, 960. (From Papers of Water Pollution Research Board, England.)

Sewage Disposal. Johannesburg's New Sludge Digestor—This account is taken from a paper contributed to the South African Institution of Engineers by E. J. Hamlin. The new type of digestor unit adopted by the Johannesburg Council consists of a flat-bottomed cylindrical tank with steel superstructure carrying the mechanism and driving unit and supporting the gas collecting tank cover. A central vertical revolving shaft carries horizontal radial arms near the surface which distribute the feed and break up the scum and, at the lower end, radial arms, to stir the sludge and move it toward the discharge cone, and a scraper in the discharge cone. Excess liquor runs off through an opening in the tank wall. The advantages of mechanical operation are said to be reduction in tank volume, even discharge of gas, and assurance of a completely digested sludge. The amount of gas is calculated at ½–¾ cu. ft. per head per day.—*South African Eng.*, 40: 193, 1929. (From Papers of Water Pollution Research Board, England.)

The Fertilizing Value of Sewage Sludge—The fertilizing value of sewage sludge depends upon the percentage of available phosphoric acid, total nitrogen, and water-soluble potash. As fertilizers, sewage sludge appears to be divided into two distinct groups: one, sludge from Imhoff tanks and similar processes, and the other that from activated sludge processes. In the Imhoff tanks, where fermentation in the absence of air takes place, the sludge goes through an extensive decomposition, leaving only the more resistant portions. The nitrogen in these more resistant portions, to be taken up by plants, must be decomposed by soil bacteria. These facts indicate why this type of sludge has not proved to be such a good fertilizer as that from the activated sludge process. Sludge from an activated plant is easily decomposed by soil bacteria and has a good availability. Of course, all activated sludge is not of equal value, because some may contain nitrogenous compounds of lower activity, which will decrease the availability of nitrogen.

Comparative analyses of two types of sludge, dried to about 4–8 per cent water, follow:

	Imhoff per cent	Activated per cent
Phosphoric acid	0.47–2.48	2.41–2.68
Nitrogen	0.88–2.99	3.69–5.54
Potash	0.2–1.44	———

Based on these figures, the retail fertilizer value of the Imhoff sludge would be about $6.55 and that of the activated about $22.65.—G. S. Fraps, *Proc. Eleventh Texas Water Works Short School,* Jan., 1929, pp. 150–152.

A Study of Lead Poisoning in a Storage Battery Plant—This study was a sanitary survey made of a small plant, of 56 employees, devoted to the manufacture of storage batteries. Air analyses were made of the various rooms where the employees worked. In only one of the six working rooms was the air free from lead. The amount of lead found was from 0.009 mg. per cu. ft. of air to 0.0453 mg.

Workers from each of the above rooms were studied and the clinical findings were recorded for each group. These data indicate that the greatest exposure existed in the assembly room, where 7 of 10 men examined showed positive lead poisoning. This high rate is due to the finely divided state of lead encountered by the working men.

The study revealed that workers exposed to 0.009 mg. of lead per cu. ft. for a period of 1½ years are not affected with chronic lead poisoning. However, if the duration of exposure is continued for 2½ years, chronic lead poisoning develops. Necessary changes in mechanical equipment and operation are suggested in order to minimize the lead dust hazard.—Leonard Greenburg, A. A. Schaye and H. Shlionspy, *Pub. Health Rep.,* 44, 28: 1666–1698 (July 12), 1929. Abstr. M. S. Foreman.

Mastitis—Raw Milk Combination Causes Another Epidemic—Following an outbreak of approximately 75 cases of mastitis in Savannah, Wayne County, N. Y., which has a population of about 600, an investigation revealed all cases investigated had used a Grade A raw milk from one dairy. Further investigation showed that one cow in the herd had received an udder injury about March 2, that a veterinarian reported no inflammation on March 6, that mastitis was discovered on March 13, and the milk not excluded until after that date.

The department's position is stated as follows: (1) that acute mastitis is a serious health menace; (2) dependency on the farmer for discovery and action is unsatisfactory; (3) monthly veterinary inspection or weekly bacterial examination of the milk or both provide a safeguard although not an entire one; (4) certain safeguard is effective pasteurization.—Anon., *Health News,* New York State Dept. of Health, 6, 13: 49 (April 1), 1929. Abstr. F. O. A. Almquist.

Pre-Determining the Extent of a Sewage Field in Sea Water—A description of a method of pre-determining the probable area and extent of a sewage field in sea water, given the quantity of sewage flow and the direction and depth of discharge. The behavior of fresh water jets in sea water was first studied, and experiments were afterward instituted in a basin of some 2 acres in extent in Los Angeles Harbor.

Fresh water colored with eosin Y was discharged into the basin from a tank on a raft; the underwater process was watched by reflection and the dilution measured by comparison with measured dilutions of the tank water. Experiments were made with vertical jets (downward and upward), horizontal jets, jets discharging upwards at 45°, and multiple jets.

Equations are given for determining the dilution of a discharge with a probable error of 4–5 per cent. Corrobora-

tion and correction of the method from observations in practice are discussed and examples of its application given.—A. M. Rawes and H. K. Palmer, *Proc. Am. Soc. Civil Eng.*, 55: 1167, 1925 and 2221, 1929.

Technical Aspects of the Prevention of Pollution of Rivers by Domestic Sewage and Trade Wastes—Questions relating to the pollution of rivers, such as standards for effluents, methods of purifying domestic sewage, pollution by storm overflows, the activated sludge process, sludge disposal, trade wastes, laws governing the admission of trade wastes into sewers, the problem of spent gas liquor, financial difficulties militating against sewage treatment, and disposal by dilution, are discussed in outline. The author sums up as follows:

> Any domestic sewage, and the large majority of trade wastes, can be purified—at a cost. The engineer is ready to do his part; the river, if given a chance, will complete the work. The chief hindrances to the purification of rivers are not technical, but financial, legislative and administrative.

—Arthur J. Martin, *J. Roy. San. Inst.*, 49, 12: 677–686 (June), 1929. Abstr. A. W. Fuchs.

Sewage Plants and Mosquito Propagation—Investigation of 42 sewage treatment plants in Bergen County, N. J., showed that 18 were directly responsible for mosquito breeding. Four examples are given: (1) An Imhoff tank sprinkling filter effluent discharging to a creek bottom, causing overflow to seven acres of meadow land, and heavy growth of mosquitoes; (2) sewage from a town one and one-half miles above a small lake of 10 to 15 acres caused mosquito breeding, requiring drainage of lake for control; (3) sewage plant effluent pooled on open meadow of three or four acres caused heavy breeding; (4) sewage plant effluent runs 1,500 feet through pipe to tide water. At high tide effluent backs up and overflows, spreading 1,000 feet on each side of pipe in cattails on low land, causing growth of mosquitoes.—John P. Peterson, *Munic. News & Water Works*, 76, 7: 288 (July), 1929. Abstr. E. A. Reinke.

On the Nature and Removal of Effluents from the Brown Coal Industry—Briquet water requires only mechanical purification though precipitation is necessary when the water is very acid. Effluents from the briquetting furnace contain nitrogen, sulphur, and carbon-oxygen compounds. The condensate contains carbon compounds in the form of alcohols, aldehydes, ketones, acetic acid and phenols. In contrast to hard coal, there are mainly present cresol or creosote, hydroquinone, resorcin, pyrogallol, and phloroglucin, all of which, in the presence of water and alkali, form resins. These effluents are very harmful to animal and plant life. The modern carbonization ovens give rise to large quantities of effluent containing 0.1–0.2 per cent of nitrogen (90 per cent as ammonia) and 0.4–0.8 per cent of phenol. Rotary generators give a very concentrated and harmful effluent. In the production of crude gas from briquets, an effluent is produced like that from the carbonization oven. Evaporation of this effluent is only economically possible when waste heat can be used. De-phenolizing is only economically possible when the content is over 2 gm. per litre. Biological processes are expensive and the lack of domestic sewage in brown coal districts makes them impossible. Only physical-chemical processes remain. Filtration through ashes has given good results and phenol can be recovered by absorption by activated carbon.—H. Stooff, *Z. angew. Chem.*, 42, 29: 783, 1929. (Papers of Water Pollution Research Board, England.)

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Lead Poisoning—The compounds of lead alone are poisonous, the handling of metallic lead and its compounds being harmless in the absence of dust. Two mg., i.e., 1/32 gr., absorbed daily will in time undermine the constitution and set up chronic lead poisoning with changes in the kidneys and arteries which will shorten life.

Industrial lead poisoning is entirely due to inhalation of leady dust or fume and not at all to handling. Absorption takes place far more generally through the lungs than through the alimentary canal. In its prevention, influences brought to bear external to the workman over which he can exercise no control, bring about the most brilliant successes in handling lead poisoning. Failure and disappointment result where this principle has not been applied as in lead smelting works, electrical accumulator factories and in house painting.

The essential thing in the decrease of poisoning in white lead works has been the discovery that the carbonate of lead has much greater affinity for oil than for water. In pottery manufacture, the drop has been due to the decreased solubility of the form of lead glaze used. The fall in the manufacture of paints and colors has been due mainly to locally applied exhaust ventilation. In the other industries mentioned above, failure to prevent lead poisoning is due to the fact that no method of cutting out the personal element has been universally applicable. Yet in one accumulator factory employing about 1,000 persons in contact with lead and in which there were 11 cases of poisoning in 1926 and 18 in 1927, after the engagement of a whole-time works surgeon to study the men in the work there were no cases reported in 1928 and none up to July, 1929.

The fall in coach painting is due to the absence of white lead in the paint, largely owing to the enormous development of spray painting of motor cars, etc., in which employers are too sensible and too frightened to use lead compounds as an ingredient of cellulose sprays. The substitution of zinc base and titanium oxide in the internal painting of buildings has resulted in a decrease of lead poisoning among house painters. In France one is impressed with the much more beautiful effects and brighter colors of their buildings with none of the dirty drab color characteristic of white lead after a short exposure to the atmosphere.

The reason that the proportion of deaths to cases is relatively so much higher in the pottery industry and house painting than in others is not that they are so much more dangerous, but because workers engage in them for longer periods and become the victims of chronic lead poisoning with its sequela of saturnism, such as Bright's disease or cerebral apoplexy, both of which are compensable under the Workmen's Compensation Law.

Figures show that females are attacked by lead poisoning about twice as frequently as males. They suffer more from headache and brain symptoms, while there is no doubt as to the baleful influence of lead on uterine function, and because of the last, employment in lead should be barred where there is interference with the function of maternity.

Most cases of lead colic occur within

the first two years of employment, while paralysis (wrist drop) is always a late symptom and is more frequent in men because their duration of employment in lead exposure is much the longer. A Recommendation of the General Conference of the International Labor Organization held in Washington, in 1919, urged that

> In view of the dangers involved to the function of maternity, and to the physical development of women, and young persons under the age of 18 years, they should be excluded from employment in the following processes.

These are, in brief, concerned with the reduction of zinc or lead ores, the desilvering of lead, the melting of lead or old zinc, the manufacture of solder or alloys containing more than 10 per cent of lead, the manufacture of various lead compounds (named) which are used in paints and glazes, and work upon electric accumulators.

> It is further recommended: The employment of women and young persons under the age of 18 years in processes involving the use of lead compounds be permitted only subject to the following conditions

(named), in regard to working conditions, notification, compensation, medical examination, protective clothing, eating places, etc. These points have been embodied in the "Women and Young Persons Act, 1920."

At the present time in this country (England and Wales) lead poisoning cases are twice as severe and the amount of chronic poisoning four times as great among house painters as among factory workers, yet there is little evidence that male lead workers are less likely to beget children although there are so many variables to consider in a question of this sort that a definite conclusion is difficult.

An analysis of 10,923 cases of lead poisoning in the past 30 years has brought out certain essential facts such as the reduction in severity and in the number of chronic cases, and consequential increase in the moderate and slight attacks. Reduction in severe cerebral symptoms is very important since these must be regarded as due to lead dust or fume. It was the cases of convulsions and blindness in quite young girls 30 years ago which agitated the public mind. Epilepsy, mental defect, and optic neuritis as symptoms of lead poisoning have decreased, in some cases remarkably.

Among 6,499 cases of lead poisoning were 680 of paralysis and 603 of muscular weakness. The right forearm is shown to be considerably more affected than the left in both paralysis and weakness. The testing of the strength of grasp and of the fingers and wrists is "the most useful single test there is for detecting chronic lead absorption rapidly." Another most remarkable feature is the wrist drop consequent upon the selective toxic action of lead on the musculo-spiral nerve.

An accompanying chart shows that the chief paralyses and weaknesses involve, in descending order: (1) both forearms, (2) the right forearm in respect to paralysis but the arms and legs together in respect to weakness, (3) the left forearm alone in both conditions, and (4) the arms, legs, fingers, etc. (The author next pokes fun at "the great ethyl petrol stunt" which used the time and attention of 11 experts from April 2 to July 16, 1928, in coming to the unanimous conclusion "that there were no reasons for prohibiting the use of ethyl petrol." Not a single case of lead poisoning from this substance has been reported in the country.

> Lead poisoning can only be prevented; it cannot be cured. Symptoms can be treated and relieved. While saying this I am not unmindful of the undoubted progress that has been made recently of how lead acts when absorbed into the system by Drs. Aub, Fairhall, Minot and Reznikoff working in the Harvard School of Public Health.

Their experiments proved that lead en-

ters the organism most rapidly by the respiratory tract; hence inhalation of lead or its compounds in the finely divided state is to be most guarded against.

Analysis of reports on 10,929 cases of lead poisoning shows in general the following: *severe* cases have included paralysis, encephalopathic conditions—convulsions and mental affections, and grave undermining of the constitution associated with Bright's disease and arteriosclerosis; *moderate* cases have included: a combination of colic with anemic, profound anemia, partial paralysis, and cases in which there is constitutional debility; while *slight* cases have included colic, constipation and rheumatic pains, anemia, and either of the above with muscular weakness.

Accompanying tables, as already stated, show a noticeable decline in severity of cases in the last 5-year period as compared with the first 2; brain symptoms are distinctly fewer; cases of paralysis fewer than they used to be (which general statement also applies to "weakness of the arms").

The tables show also the percentage by sex of such main symptoms as: "gastric, anemia, headache, paretic, encephalopathy, rheumatic, and other," divided into four 5-year periods, 1900–1924 inclusive.—Sir Thomas Morison Legge, late H. M. Senior Medical Inspector of Factories (England and Wales), *J. Roy. Soc. Arts*, LXXVII, 4007: 1023–1039 (Sept. 6), 1929.

Occupational Diseases in 1929 Show Lead Poisoning Led in Fatalities—This is a preliminary summary of 1,381 occupational disease claims filed with the Industrial Commission of Ohio for the year 1929. These claims, of course, have not all been allowed and some of them have been proved not to be occupational diseases. In the total were 78 claims for tenosynovitis which was not on the list of compensable diseases during 1928. Also, 102 claims were for afflictions not on the compensable schedule, leaving 1,279 to be considered by the commission for payments.

Of 37 death claims, 9 more than for the year 1928, 10 were for non-compensable diseases and the remaining were for the following: dermatitis 3, lead poisoning 19, benzol or derivatives 2, anilin poisoning 1, volatile petroleum products such as benzine or naphtha 2.

There was a total of 911 claims for occupational skin diseases which, exclusive of the 3 death claims, had an average period disability of 11 days each. There was a total of 189 claims for lead poisoning for which, deducting the 19 death claims, the average number of days lost per claim was 33. There were also 61 claims for compressed air illness.

In the group of 102 non-compensable claims there were 30 cases of tuberculosis, 13 asthma, 21 bronchitis, 6 poisonings, 11 infections or contagions, 10 inflammatory conditions, 5 various forms of neuritis, and 4 arthritis, with 2 not classified. [A considerable number of the claims for lung conditions were found to be due to silicosis and other forms of pneumonokoniosis according to the records of the same cases which were investigated by the State Department of Health.—E. R. H.]—Unsigned, Ohio Industrial Commission Monitor, 3, 2: 303 (Feb.), 1930.

New Rule Applying to Minors Employed in Spray Coating Operations—The following rule was adopted by the Industrial Board of the State of Pennsylvania at its meeting on October 16, 1929:

No person under 18 years of age shall be required or permitted to spray coat objects with any substances containing lead, benzol or ground siliceous material.—

Labor & Industry, Pa. Dept. of Lab. & Ind., Harrisburg, XVI, 11: 5 (Nov.), 1929.

Laboratory Facilities to Assist Industry—The facilities of the laboratory and technical service of the Connecticut State Department of Health are offered to industries of that state for the determination of gases, dust, fumes, and toxic materials; air velocity, temperatures, humidity, ventilation, or any conditions or processes affecting the health of employees.

A number of studies have already been made for industries doing sand blasting, such as the determination of the efficiency of the protective devices provided and practical suggestions to decrease the dust hazard to the workers exposed. Studies of causes and methods of prevention of dermatitis have been made as well as studies of other environmental working conditions.—Division of Industrial Hygiene, *Connecticut Health Bull.*, 44, 1: 20 (Jan.), 1930.

Compensable Occupational Disease Institute—This course was planned to meet the need for definite information about occupational diseases included in the New Jersey Compensation Law. It was also conducted for industrial managers and physicians. The subjects were arranged for Tuesday evening each week for 5 weeks to consist of lectures with illustrations, followed by round table discussions.

The first lecture considered Industrial Poisons, Dr. Harrison S. Martland introducing the subject and discussing the effects, and the Hon. John Roach discussing the Act relating to Industrial Diseases.

The second week included a lecture on Lead Poisoning by Dr. G. H. Gehrmann, of the E. I. duPont de Nemours & Company and by Dr. A. J. Lanza, Assistant Medical Director of the Metropolitan Life Insurance Company, and a lecture on Carbon Monoxide Poisoning by Dr. May R. Mayer of the New York Department of Labor.

The third week's lecture considered Benzol Poisoning, presented by Dr. Leonard Greenburg of Yale University and Dr. H. F. Smyth of the University of Pennsylvania.

The fourth week considered Anthrax by Dr. Elizabeth B. Bricker of the Pennsylvania Department of Labor and Industry, and Chrome Poisoning by Dr. J. J. Bloomfield of the U. S. Public Health Service.

The fifth week comprised a lecture on Mercury Poisoning by Dr. Henry H. Kessler, Director of the New Jersey Occupational Disease Clinic, and a lecture on Wood Alcohol by Dr. R. H. Price of the E. I. duPont de Nemours & Company.—Newark Safety Council, Department of Labor, Occupational Disease Clinic, and the Essex County Medical Society (New Jersey), Feb. 11–Mar. 11, 1930.

Small Arms Ammunition—General information concerning the manufacture of cartridges and shells for rifles, shotguns, and similar small arms is discussed in this bulletin, including a brief review of the personnel and regulations in one of the government arsenals, as well as in two large private industries. There is also a classification of some 20 "Jobs" or industrial processes in the manufacture of powder, shells, bullets, shot, loading, reclaiming, testing, plating, detonating mixtures, and primers.

Dr. Carey P. McCord discusses the potential health hazards in the various processes in which several thousand persons are concerned.—*Industry Rep.*, V, 1: 1–12 (Jan.), 1930.

Industrial Medicine—Bernardino Ramazzini, in the years near 1690, laid the foundations of industrial medicine and has become its patron saint. In his "Diseases of Artificers and Trades-

men," published in 1700, he considered in 43 chapters the occupational ills of many types of tradesmen and even some of the professions. At that time there was, comparatively, a small number of dangerous chemicals but he described them with surprising insight.

Today the complex chemical intoxicants are so numerous that they may not even be enumerated. Said Ramazzini:

If we consider what a vast difference there is between the Europeans and the Americans, and other barbarous nations of the New World, we can't but be sensible that mechanik arts have contributed very much towards the civilizing of mankind.

Today, the foremost objectives of industrial medicine are:

1. To fit every person to types and quantities of work according to his ability, and without injury to himself or fellow workmen, and with profit to all concerned
2. To maintain fitness for work both as respects the individual and his environment
3. To educate the worker, particularly in personal hygiene and accident prevention.
4. To reduce absenteeism in any way related to health

Medical care of entire communities in mining areas or kindred enterprises, through contract arrangements, with the family as the unit, may lead to organized or socialized medical care, but it is not within the scope of industrial medicine. The layman's activity to turn the bad by-products of human impairment in industry into profit succeeds only when he does so through skilled industrial physicians. Industrial medicine should be neither purely "fraternal" nor "paternal." It must deal with the worker as a producing unit and not as a social unit. It centers about the factory and not the home. Its activities partake of the practice of both public health and curative medicine, and it deals with workers as individuals and in groups. Essentially conceived in selfishness, industrial medicine culminates in humanitarianism.

The need is great for organized medicine (1) to mark the just and proper domain of acceptable industrial medicine, (2) to stimulate a demand for the truly qualified industrial physician, and (3) to limit industrial medicine wholly to the boundaries set forth. If industrial medicine becomes merely a pathway to general care of all the sick by poorly educated, low salaried medical "hacks" it will defeat the very need by which it came into being.—

Editorial, *J. A. M. A.*, 94, 1: 33-34 (Jan. 4), 1930.

Western Electric Company Experiment—During the past two years, Elton Mayo and officials of the Hawthorne Works of the Western Electric Company in Chicago have been conducting experimental investigations of rest periods, working conditions, and other influences affecting workers. The investigators showed, at least tentatively, and in highly mechanized and repetitive operations, that—

1. Total daily output is increased by rest periods and not decreased.
2. The conditions of work during the working day have more effect on production than the number of working days in the week.
3. "Outside" influences, i.e., conditions not directly relevant to the task, tend to create either a buoyant or depressed spirit which is reflected in production. A distinct relationship is apparent between the emotional status of the workers and the consistency of their output.
4. The method of the supervisor is the most important single "outside" influence. Home conditions may affect the worker and his work; and a supervisor who can "listen" and not "talk" can in many instances almost completely compensate for such depressing influences.
5. Pay incentives do not stimulate production if other working conditions are wrong.

The most important and significant result is that dealing with the method of supervision. It was found that "bully-ragging" methods of supervision not only depressed workers but their production. It was found that workers came to increase their liking for their jobs with the new kind of supervision which substituted sympathetic "listening" for officious "talking," with a consequent increase of production.—*The Human Factor*, VI, 1 (Jan.), 1930.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

The Effect of **Cod Liver Oil Feeding on the Calcium and Phosphorus Content of Cows' Milk**—While it has been definitely shown that the vitamin D content of the cow's milk can be increased by appropriate feeding and sunlight and that the retention of calcium and phosphorus is improved, the reports are conflicting as to the effect on the quantity of calcium and phosphorus in the milk and their relationship. In the course of investigations which have been lately reported, an opportunity was afforded to analyze milk for calcium and phosphorus during certain test feeding periods.

Short-horn cows were given a maintenance ration of hay and sugar pulp and a milk production ration consisting of various meals, corn and oats so that 3½ lb. of the mixture contained 2½ lb. of starch equivalent and 0.6 lb. protein equivalent. With this diet the milk of each animal remained unchanged for 4 or 5 months.

The experiment consisted of 6 periods: (1) normal diet; (2) 0.5 oz. olive oil per 3.5 lb. portion ration mixture fed; (3) 1 oz. olive oil per 3.5 lb. portion ration mixture fed; (4) 1 oz. cod liver oil per 3.5 lb. portion ration mixture fed; (5) 1 oz. olive oil per 3.5 lb. portion ration mixture fed; (6) normal.

Daily determinations of calcium in the milk were made and phosphorus determinations for each period on daily aliquots. The figures show no change in the percentage of calcium and phosphorus in the milk when cod liver oil is substituted for olive oil and neither oil effected a change over the normal diet. While daily fluctuations in calcium were noted the total for the period for each cow was the same, and this with a constant milk yield over the period.

It was noted that the addition of cod liver oil materially reduced the percentage of fat in the milk.—Edmond John Sheehy and Brendan Joseph Senior, *Biochem. J.*, 23: 898, 1929.

The Influence of Different Samples of "Casein" on Vitamin Tests—Previous work from this laboratory has shown a difference in nutritional characteristics of two commercial varieties of casein (Abstract *A. J. P. H.*, 20: 213, Feb., 1930). This work records direct comparison of two types of commercial casein, "light-white casein" and "vitamin-free casein," designated respectively as "Casein B" and "Casein G." "Light-white casein" contains 2 to 3 per cent of fat which was extracted with alcohol and ether to insure absence of vitamin A. One-half of each of 5 litters of rats was given "Casein B" and the other half "Casein G," vitamin D being supplied with irradiated ergosterol. At the cessation of growth cod liver oil was administered.

The growth curves show the following points: All rats on "Casein B" maintained steady weight and responded to cod liver oil. Two of the litters on "Casein G" grew similarly, indicating the possibility of reserves in the rats or the adequacy of the casein in these two cases. The last 3 litters on "Casein G" did not respond in growth or to the addition of cod liver oil, indicating less reserve factor or inadequacy of the protein. The authors attribute the discrepancy to either the presence of a

heretofore unrecognized factor in one casein or to a different biological property, digestibility or assimilability.

The point is made that in an assay for vitamin A attention should be paid to the source of protein and the present U. S. P. assay for vitamin A is criticized since in the light of this experiment results might be discordant. It is suggested that for comparable results on vitamin A test a standard laboratory material should be agreed upon.

These two types of casein were further tried in vitamin B tests in which the casein, dextrinized rice starch, agar-agar, salt mixture and cod liver oil were used with the rats on screen-bottomed cages. After 11 days of this diet, amounts of dried yeast equal to 2, 5, 8 , and 10 per cent respectively in the diet were given with no growth after 10 days.

The " Casein G " in the test diet was substituted by " Casein B," which was shown to be free from vitamins B_1 and B_2. A control not receiving dried yeast died in 3 days and two rats receiving 5 and 10 per cent dried yeast grew rapidly to 140 and 210 gm. weight. A rat with 8 per cent dried yeast and the " Casein G " diet grew but much less than the one with 5 per cent yeast and " Casein B."

The results were practically duplicated when marmite was used instead of dried yeast. Other experiments indicated that the yeast had its usual vitamin B potency, suggesting that the different results are due to a factor present in one casein and not in the other and that various litters had different reserves of the unknown factor or different powers of utilizing " Casein G."—Katharine Hope Coward, Kathleen Mary Key, Barbara Gwynneth Morgan and Marjorie Camden, *Biochem. J.*, 23: 913, 1929.

The Epidemiology of Paratyphoid Infections—A comprehensive resumé of the most recent knowledge of this enteric group as presented in the Cutter Lecture in Preventive Medicine at the Harvard Medical School on March 28, 1929, forms the basis of this paper. The tangled condition of the nomenclature is discussed and the group classifications limited to a less confusing and workable basis.

Comparison is made of the means available for diagnosis of paratyphoid infections with conclusions that the only sure means of diagnosis is the isolation and identification of the specific bacterium involved rather than dependence upon serological tests. The unreliability of agglutination tests with serum from patients is stressed.

A critical study of the frequency or incidence of paratyphoid infections indicates a far greater proportion of paratyphoid carriers as compared to typhoid carriers than has generally been supposed. It is indicated that from one-fourth to one-half of so-called typhoid fever is really paratyphoid infection. Considerable attention is given to the differentiation of the various types included among the Salmonella and the confusion prevailing within this genus due to inadequate differentiation which has given rise to many of our present epidemiological uncertainties with respect to the existence of various "types" or species.

The epidemiology of paratyphoid infection is discussed under the head of specific types that have been fairly definitely implicated in the causation of human illness. The types included in the discussion were *S. paratyphosus (A)*, *S. Schottmülleri (B)*, *S. aërtrycke*, *S. enteritidis*, and *S. cholera-suis*.

There were some types mentioned such as *S. abortivo-equinus* and several bacilli of avian paratyphoid that have not been clearly associated with infection of man.

The main sources of infection by organisms in this group are divided on the basis of human and animal origin. *S.*

paratyphoid (*A*) and Type B *Schottmülleri* are given as human parasites with which the lower animals are seldom if ever infected. In contrast to these two types the *aërtrycke, cholera-suis* and *enteritidis* strains seem to be primarily related with animal infections. This distinction, however, cannot be drawn too fine as it is known that some of the latter strains can cause disease in animals, give rise to food poisoning as well as occasionally cause active infection in man.

Attention is called to the epidemiologically significant fact that Types A and B commonly display invasive qualities, often entering the blood stream, while the animal paratyphoids are rarely invasive and are important pathologically mainly because of their ability to produce absorbable toxins.

Experimental work on the toxic products of this group of organisms is discussed and attention is given to recent work with heated culture filtrates that were fed to animals for the purpose of reproducing symptoms of "food poisoning." While apparently the toxic filtrates were not materially impaired by heat treatment as indicated by intravenous or intraperitoneal injection into laboratory animals, negative results were obtained when similar material was used in feeding tests.

In discussing the degree of protection afforded by vaccination against infection of the members of this group it was considered probably safe to assume that vaccination with the A and B types gives about the same degree of protection as that conferred by antityphoid vaccination, but there is no reason to suppose that any material protection would be conferred by the addition to so-called triple vaccine of *aërtrycke* and other closely related strains.

The lecture concludes with a review of the most recent knowledge of experimental epidemiology bearing on the spread of paratyphoid infection in man and animals and discusses the measures likely to be most successful for control of paratyphoid infections of human and animal origin.—Edwin O. Jordan, *J. Prev. Med.*, 3: 279 (July), 1929.

"Food Poisoning" Produced in Monkeys by Feeding Living Salmonella Cultures—Rhesus monkeys fed with viable cells of two strains of the Salmonella group, *S. aërtrycke*, and *S. enteritidis*, manifested definite and characteristic symptoms of "food poisoning," watery diarrhea, general malaise with, in some cases, loss of appetite. Loss in weight was observed after 2 to 7 days.

Little if any immunity seemed to be produced by one attack of "food poisoning." A second attack could be produced in the same animal after a short interval. Monkeys fed with equivalent amounts of heat killed cultures showed no symptoms. Control feedings of living cells of *B. proteus* and *B. coli* were negative.—G. M. Dack, E. O. Jordan and W. L. Wood, *J. Prev. Med.*, 3: 153 (Mar.), 1929.

The Effect of Grape Juice on Nitrogen Retention and Urinary Acidity—The literature records both an increase and decrease in urine acidity according to the fruits ingested and there is some evidence that orange juice has a favorable effect on nitrogen retention. The present work deals with a commercial grape juice on a group of normal women.

In the first series, the basal diet of crackers, cheese, apple butter and almonds was supplemented by grape juice. In the second series, the basal diet was supplemented by grape juice in two experiments and by the caloric equivalent of the grape juice in glucose in two other experiments.

After a 5-day adjustment period, in the 3- to 4-day experimental period following daily nitrogen determinations of

urine and feces were made. In the first series the nitrogen retention was greater in the grape juice supplements. In the second series with equivalent energy diets the increase in nitrogen retention was insignificant—0.28 and 0.48 gm. compared to 0.98 and 1.11 gm. on the grape juice plus basal diet in the first series—indicating the nitrogen retention due probably to the sparing action of the carbohydrate in the juice.

In these series the urinary acidity remained almost constant. In one case there was a slight decrease, and in three a slight increase following grape juice addition, showing considerable quantities of grape juice have little or no effect on urinary acidity.—Louis M. Pickens and Rossleene Arnold Hetler, *J. Home Econ.*, 22: 44 (Jan.), 1930.

Hypervitaminosis and Vitamin Balance. IV. An Instance of Vitamin Balance—Only two references in the literature are cited as to the lack of balance between vitamin B complex and vitamins A and D or cod liver oil and one of these is the previous work of the present authors. In the former experiment large quantities of cod liver oil were administered and in the present experiment, oil concentrate. Similar basal diets were fed to matched sets of young rats supplemented by 1, 2, 4, 8, 16, and 32 per cent standard marmite extract. To each set cod liver oil concentrate at the rate of 2, 10, 50 and 250 mg. per 10 gm. of basal diet was added.

At the 1 to 2 per cent marmite level, 0.10 per cent concentrate did not stop the decline. At the 3.2 per cent marmite level the addition of 0.10 per cent concentrate caused decline in weight but at the same level without concentrate rats were smooth-coated and did not decline in weight. Two animals on the 2.5 per cent concentrate died; controls receiving only 0.02 per cent concentrate remained well and grew. In the 8 per cent marmite level, optimal for ordinary diet, up to 0.5 per cent concentrate did not cause death but retarded growth. The 16 to 32 per cent marmite level concentrate up to 2.5 per cent was tolerated and two animals died.

The symptoms caused by excess of vitamins A and B parallel those with simple vitamin B_1 deficiency. The probability that the high doses of A and B concentrate are in any way poisonous is offset by the ability of the rats to withstand increased doses with increased marmite allowance. It appears more probable that the effect is not due to toxic action of vitamins A and D but to relatively inadequate vitamin B balance since the symptoms resemble B avitaminosis.

It is pointed out that vitamin D was administered at levels from 6 to 750 times the minimal physiological dose while other works have shown that a thousand times the minimal as irradiated ergosterol does not act unfavorably.

Vitamin A was increased from 200 to 25,000 times the minimum dose, hence the conclusion that the lack of balance is due to the vitamin A of the concentrate although the effect of other unidentified substances cannot be excluded.—Leslie Julius Harris and Thomas Moore, *Biochem. J.*, 23: 1114, 1929.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Miss Fox Goes to New Haven—The American Red Cross has announced the resignation of Miss Elizabeth G. Fox, the National Director of their Public Health Nursing Service, to take effect some time in May. She will become Executive Director of the Visiting Nurse Association of New Haven, Conn., and a member of the faculty of the Yale School of Nursing.

Miss Fox came to the Red Cross nearly twelve years ago as Associate National Director of Public Health Nursing. Since August 8, 1919, she has held the position of National Director of Public Health Nursing. A native of Wisconsin, she attended the University of Wisconsin where she attained high scholastic honors. Following her training at the Johns Hopkins School of Nursing she held key positions on the nursing staffs of the University Hospital, University of Minnesota; Chicago Visiting Nurse Association; Dayton, O., Visiting Nurse Association; and the Visiting Nurse Society, Washington, D. C.

Miss Fox has at one time or another served in high elective or appointive positions in most of the local, national and international nursing associations with which she has been identified. In Washington, D. C., she was president of the Graduate Nurse Association and president of the Board of Nurse Examiners. She has been president, also, of the National Organization for Public Health Nursing; chairman of the Public Health Nursing Section of the American Public Health Association; and a member of the Nursing Advisory Council of the League of Red Cross Societies.—Letter to Red Cross Nursing Field Representatives by the American Red Cross, Feb., 1930.

The Public Health Nurse and Social Hygiene—Late last summer, through a financial arrangement with the American Social Hygiene Association, Edna L. Moore was added to the professional staff of the National Organization for Public Health Nursing, as Assistant Director. She will concentrate her efforts on interesting and educating public health nurses in the problems of social hygiene. In the January, 1930, *Public Health Nurse* she says:

> The public health nurse, because of her established position in the community and her intimate contact with the home, has many opportunities to reach out into this field where educators are giving such splendid leadership. To grasp these opportunities and accept the responsibilities they carry, demands, primarily on the part of the nurses, an attitude of understanding and acceptance toward sex problems.

She goes on to say that the venereal disease question is a health question from our point of view, and it should be treated as such without confusing it with the idea of reform, because if men or women suffering from venereal disease sense in us the idea that their condition implies an act utterly reprehensible to us, we cannot hope to gain their confidence or help them to help themselves.

Up to the present time the public health nurse has played a small part in the venereal disease control program, and Miss Moore thinks it is because of inadequate preparation combined with

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* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 126 State House Annex, Indianapolis, Ind.

lack of leadership and too many other duties. We need specific answers to three questions:

1. How is community health affected by syphilis and gonorrhea?
2. What are the community resources to find and treat those affected?
3. What, precisely, can public health nurses do about it?

Some suggestions are given as to how public health nurses can help: Develop and extend prenatal work, as too many obstacles separate the expectant mother from diagnosis and the pregnant syphilitic woman from adequate treatment.

The public health nurse has many opportunities to discover congenital syphilis and avert some of its tragedies in her preschool, school and industrial nursing work.—Edna L. Moore, The Place of the Public Health Nurse in Social Hygiene, *Pub. Health Nurse*, XXII, 1: 32 (Jan.), 1930.

The Institute for Lay Boards in Chicago—This institute arranged by the Central Council of Nursing Education for lay boards of hospitals and public health nursing organizations was held at the Palmer House in Chicago, February 17.

The morning program was largely given over to public health nursing problems.

Edna L. Foley, R.N., superintendent of the Chicago Visiting Nurse Association, gave an address on "The Education of the Nurse from the Point of View of Public Health Nursing." She made five suggestions as to how the hospital nursing schools should prepare nurses for the public health field:

1. Prepare young women of *character*.
2. Give them certain fundamental essentials of social work.
3. Arrange for affiliation with a public health nursing association.
4. Arrange for lectures to arouse interest in patients as human beings.
5. Send nurses into this field who are socially adequate.

Miss Foley says the visiting nurse's motto should be—"Practice what you preach and teach at the same time."

Haven Emerson, M.D., of Columbia University, gave an address on "Public Health Nursing—Indispensable and Economical for Everyone if Organized," in which he stressed the need for the unification of all public health nursing services in a community in a generalized program as the only means of insuring an economical and really effective service. Following are some of the facts and suggestions from his talk:

The rating of health of 24 cities in the United States runs closely parallel to the number of public health nurses employed, and the death rate is not a good index of the public health work in a community.

In 24 cities in the United States, forty per cent of the public health nurses are serving 20 per cent of the population.

A city caring for 40 per cent of the defects of school children is going a long way toward tuberculosis prevention.

Thirty per cent to 50 per cent of clinic patients need mental hygiene more than anything else.

These are all arguments for generalized public health nursing services.

The nursing technic of the good visiting nurse associations is as adequate as that in the operating rooms of the best hospitals.

Michael M. Davis, M.D., of Chicago, in discussing Dr. Emerson's paper said that most of the money paid for the care of patients in a visiting nurse association came from life insurance companies. In 25 cities studied only two visiting nurse associations earned as much as 21 per cent of their money from fees from individual patients for service rendered; in 19 cities the fees from this source were less than 10 per cent.

Dr. Davis said that the way to increase the amount of money derived from direct service is to present nursing service through community chest and visiting nursing association campaigns in terms that are *not* charity.

yet, at the same time, insuring free care for those unable to pay.

A High School State Board of Health—The following program has been worked out for a senior high school board of health only this year, in the Morton Senior High School at Richmond, Ind. Because of the general educational trend which we hoped it would take it was patterned after the State Board of Health, rather than the City Board of Health. One member from each of the 40 assembly rooms was elected by his group to membership on the board. From this representation were elected a president, vice-president, secretary, and 4 division chairmen. The divisions were named health and hygiene, communicable diseases, vital statistics, and sanitation. Each member of the board was appointed to serve on one of these divisions. The dean of the high school is faculty sponsor, and the school nurse, who is Director of Public Health Nursing in Richmond and Wayne County, is professional sponsor. Each division has a faculty adviser; i.e., the biology teacher is adviser for the division of communicable diseases; the chemistry and physics teacher for the division of sanitation. The vital statistics division is sponsored by the teacher of printing. The work of the health and hygiene division is sponsored by the French teacher, whose particular interest is in personal hygiene.

The board meets monthly to hear reports from the division chairmen, make plans for future projects, and discuss health problems. Division meetings are held at the call of the chairman not less than once monthly. A report of the meeting is sent to each teacher the following day, this report to be posted where her advisory group can read it.

The results have justified the existence of this organized effort and the board of health bids fair to become a potent factor in the development of a health consciousness in the school.—Virginia Jones, R.N.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

Joyous Living Longer in Syracuse—The new radio "club" was announced as follows:

A Live-A-Little-Longer Club is being started in Onondaga County. Its object is to enable its members to be as healthy and strong as Jack Dempsey and Helen Wills, as beautiful as Apollo or Billie Dove and as old as Methuselah.

Membership is open to everyone, young and old alike, even including bald-headed men who have lost all their teeth. The preliminary announcement about this new organization states that it does not cost a single red cent to join. Its rules for avoiding sickness and for prolonging life are to be as free as the very air that people breathe.

During the past half century the average age of the American people has been raised from 40 to 57 years. The announcement states that there is every reason to believe that the average length of life can be still further extended.

The Club is sponsored by the Health Educational Division of the Onondaga Health Association. The meetings of the Club will be held at 6 o'clock each Wednesday evening and will last only about five minutes. Those desiring to join are invited to tune in on WSYR, Hotel Syracuse Broadcasting Station, promptly at 6 o'clock each Wednesday.

Education in Clinics—At Boston, June 9, at the National Conference of Social Work, will be continued the discussion of health education in clinics which was started at the A. P. H. A. meeting in Minneapolis.

Please help by sending samples, photographs, answers to the following questions:

Do you use exhibits? What are they? Where do you display them?

Do you use posters or placards? Where secure them, or do you make them?

Do you use slides or film-slides?

What do you have for people to read? Do you use scrap books or printed matter mounted in any fashion?

What else do you use, or do? What do you like, or object to?

Examples of devices and material will be shown at this session of the Health Division. Address your contributions to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Health Demonstration Before Rotary Club—A Georgia Health Center asks for ideas to be forwarded via editor of this department:

We have been asked to put on a program for the Rotary Club at a luncheon meeting. Last year we gave demonstrations of the actual work carried on at the Health Center, to which they contribute.

The Health Center Program consists of visiting nursing, clinics (curative and preventive), milk depot, baby stations, and school nursing service. If you could give us any suggestions for this program, we would appreciate it very much indeed.

More Statistics in State Press Releases—Another group of the lead paragraphs from Illinois press releases illustrate possibilities in effective use of statistical data. The full release in many cases could be adapted to other states, and with further changes could be adjusted for large city use.

Springfield, February 12: Mistaking symptoms for disease and treating terminal instead of incipient conditions account for a major part of Illinois' $120,000,000 annual sickness bill. This, according to Dr. Andy Hall, state health director, is proved by an experiment with 6,000 individuals which shows an 18 per cent reduction in mortality as a result of annual medical examinations during apparent good health.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

"The experiment shows that 6,000 policy holders of a certain insurance company were given annual medical examinations over a period of 10 years," said Dr. Hall. "This group, selected at random, enjoyed an 18 per cent better mortality experience than the other policy holders in the company of comparative age. In economic terms the 6,000 individuals got $3.00 back in the form of extended earning time for each $1.00 spent for the examinations."

Springfield, February 19: By far the biggest decline in nearly a decade marked the course of mortality from tuberculosis in Illinois last year. This statement was accompanied here today by an announcement from Dr. Andy Hall, state health director, that April will be devoted to an extensive campaign against tuberculosis in children, the great seed-bed of the disease. At last year's rate of decrease, tuberculosis will practically disappear from the state in 25 years.

"Provisional figures show that mortality from tuberculosis reached a new low level in Illinois last year when 5,248 deaths gave a rate of 70 per 100,000 population," said Dr. Hall. "This is 4 per cent below any previous rate ever registered in the state, while the degree of decline was greater than for any year since 1921. The actual number of deaths fell 200 below the 1928 figure while the population is estimated to have increased by 82,000. The decrease last year in tuberculosis took place in Chicago as well as down-state."

Springfield, March 5: An expanding practice of birth control on the one hand and a growing effectiveness of disease prevention on the other are indicated in statistics made public here today by Dr. Andy Hall, state health director, which show sharp declines in the birth and mortality rates for Illinois last year.

The number of births in the state last year fell a full thousand below the 1928 figure, giving a rate of 17.2 per 1,000 population, the lowest rate on record in Illinois. Deaths dropped 2,403 under the number for 1928, giving a rate of 11.7, one of the most favorable on record.

The 128,634 births and the 87,789 deaths registered in the state last year gave an excess of 40,845 births over deaths. This figure gives a net increase in population from this source of about one-half of one per cent and adds about one person per square mile to the density of population.

Excess of births over deaths in Illinois has dropped from 71,228 in 1921 to 40,845 last year, a fall of 42 per cent in the ratio. In the face of an increasing population the actual number of births has declined from 144,637 in 1921 to 128,634 last year, a drop of 11 per cent.

The continued fall in the birth rate, which involves the best elements in the population much more than the worst, would be a cause of distinct alarm were it not for the somewhat compensating influence of preventive medicine. . . .

Social Work Publicity at Boston in June—At the National Conference of Social Work, the Health Division will have one education-publicity session; Educational Publicity Division, 5 morning sessions; and Social Work Publicity Council, 10 luncheon, afternoon and dinner sessions, with several simultaneous round table groups. Public health workers make up the largest membership group in the S. W. P. C., so that a goodly number of live health workers will be at Boston. Frank Kiernan, Massachusetts Tuberculosis Association, is the Boston local chairman for the publicity group.

The Beginnings of Health Education-Publicity—When did p o p u l a r health education begin? When did one or more forms of publicity become generally accepted as a phase of public health?

These and related questions have been raised recently by several editors and writers. What can you dig out of the past? Please write to editor of this department. Samples of the earliest publicity of any kind—from 10 years ago, or 20 years, or further back—will be received with much appreciation.

New England Health Institute—Meeting in Boston, April 14–18, the Public Health Education Section under the chairmanship of Ira V. Hiscock will present the following:

Training for Health Education—C. E. Turner, Richard Schmoyer; Printed Matter Clinic—R. S. Patterson, H. E. Kleinschmidt, P. E. Gillingham, Harford Powell, Jr.; Health Education—Mabel Bragg, Ernest Stephens; School Health Education and Public Health—M. L. McWilliams, Fredrika Moore; Planning an All-Year Round Program on Health Publicity—M. S. Routzahn, F. L. McKay; The

Place of Health Education in Normal Schools—F. W. Wright, J. A. M. Andress; Individualization in Public Health—R. C. Cabot.

Section on Vital Statistics will have: Annual Reports Use and Abuse—I. V. Hiscock, Charles Duncan; Use of Statistical Tracts in Planning Health and Social Propaganda—Iago Galdston, J. J. Balf.

A Division of Public Health Education—The recently issued report on 1928 health education by the New York State Department of Health tells of a surprising amount and variety of the educational work. The main topics covered are: radio talks, newspaper use of radio talks, the weekly bulletin, newspaper publicity, correspondence course for nurses, conference of health officers and nurses, exhibits and motion pictures, lectures, correspondence, Department publications, mailing room activities.

In handling requests for information much use is made of the mimeographed press releases of the radio talks. A list of 51 radio talks is given in the report. *Free.*

Again General Warnings Are Questioned—Under "Too Much, or Too Little" (Oct., 1929, page 1171) we quoted *Editor and Publisher* in criticism of health warnings against unidentified products. Another point of view is expressed by F. P. A. in the *New York World:*

> Our belief is that Dr. Wynne's so-called war on radio broadcasting by so-called fake medical advertising is toothless. What are the concerns that Dr. Wynne thinks broadcast fake medical advertising? What are some of the alleged quack remedies advertised? Are they harmful, or habit-forming, or both?

Photographs Wanted—Several book publishers are seeking photographs illustrating health conditions or health education methods. If you have good photographs to offer, please tell the editor, and write George H. Betts, School of Education, Evanston, Ill., for the list of 46 subjects wanted for a revision of the Emerson and Betts Health and Hygiene Series to whom "any striking health activity or safety measure will be acceptable." You get credit *and cash.*

Forms of Printed Matter—For the benefit of writers who are confused in their use of terms to apply to various types of printed matter, it seems desirable to reprint some definitions.

> *Handbills*—"The handbill or dodger is a single sheet printed on one side which is handed to people on the street, dropped into house mail boxes, thrown on doorsteps, or posted in public places. . . . The handbill is usually small enough (about 6 by 9 or 8½ by 11 inches) to be carried in the hand and large enough to be posted on a wall or bulletin board."

Further discussion of the place of the handbill in the publicity scheme, and how to make it most effective, will be found in *Publicity for Social Work.*

(Further definitions next month.)

Propaganda—"Propaganda," says Edmund B. Chaffee, "has been used as far as we can learn by every great social, political and religious movement which the world has known."

> But just what is propaganda? The *Encyclopedia Britannica* defines it as "a concerted scheme for the promotion of a doctrine or practice, more generally the effort to influence opinion." This is the *Encyclopedia* definition but possibly we can get at the real meaning to the average man by saying that the essence of it consists in the spreading of reports and deductions from them for the purpose of influencing public opinion and conduct. These reports, of course, may be true, partly true, or false. They may be by word of mouth or the printed word. They may spring from good motives or from bad. These things make no difference as far as our word is concerned. The word propaganda covers any deliberate effort to disseminate information for the purpose of influencing conduct in the direction desired by the propagandist.

Then follows an interesting discussion of "Ethics and Propaganda," in *Unity*, 700 Oakwood Blvd., Chicago, Ill., Feb. 3, 1930. *15 cents.*

RADIO

New York State Department talks: Security and Mental Health, Modern Magic (prevention of babies' sore eyes), A Horoscope for 1930–1931 (the "signs" of health).

The U. S. Public Health Service has issued these talks: Some General Dietary Hints, Heart Disease and Its Prevention, Preventing Diseases of the Teeth and Gums. (Much good material after the "big words" have been eliminated.)

The Department of Health of New York City has broadcast on the following: How to Get Fat, Facts About Quacks, Winter Exercise, The Common Cold, Tuberculosis—Early Discovery—Early Recovery (about 2,300 words each).

The series of radio talks on radio quackery, broadcast by the Health Department of New York, will be supplied upon request.

Broadcasting by the Connecticut State Department of Health has been changed to 12:00 noon (Eastern) on Thursdays. Station WTIC.

The Live-A-Little-Longer Club, Onondaga Health Association, Syracuse, holds its weekly meetings via radio at 6:00 p.m., Wednesdays. Station WSYR. The opening session has been mimeographed for distribution.

The House Fly, several mimeographed sheets, provides broadcast material or copy for other uses. Lively and very frank as to fly filth. Address Rutherford County Dept. of Health, Murfreesboro, Tenn.

See also "Dates Ahead."

DATES AHEAD

April—Early Diagnosis Campaign. Address National Tuberculosis Association, 370 7th Ave., New York, N. Y. A variety of materials and suggestions are available. Especially interesting is the "Manual" which is supplied in one booklet, or in three booklets divided for workers with physicians, school groups, and parents and the public.

April 14–18 (Monday–Friday)—New England Health Institute, Boston. With various publicity sessions. Address George H. Bigelow, Dept. of Public Health, Boston, Mass.

April 17 and 24 (Thursdays)—Broadcast by American Junior Red Cross via Columbia System. The program:

> With a cast made up of Juniors assisted by a professional character actor the program will demonstrate a Junior council meeting attended by a physician who, at the request of the council, has made a study of health conditions in the community and the school. The Junior council receives the doctor's report, comments on various phases of it, and develops with his help the remedies for the undesirable health conditions which exist in the town.

April 26–May 3—Boys' Week, with Tuesday, April 29, as "Boys' Day in Schools and Health Day." Address National Boys' Week Committee, 211 West Wacker Drive, Chicago, Ill.

May 1 (Thursday)—May Day and Child Health Day. Address American Child Health Association, 370 7th Ave., New York, N. Y. Special material includes: pageant, poster, Festival Book, Play Day—The Spirit of Sport, Teamwork for Child Health, Child's Bill of Rights, recreation poster, a simple musical pageant, cuts or mats of May Day seal, and a series of mimeographed sheets of suggestions.

May 7–10 (Wednesday–Saturday)—National Tuberculosis Association, Memphis, Tenn. With a critique of printed matter by Douglas McMurtrie of Chicago, and a demonstration of the Tuskegee travelling health school.

May 12 (Monday)—National Hospital Day.

May 18–21 (Sunday–Wednesday)—Advertising Federation of America,

Washington, D. C. Address at 420 Lexington Ave., New York, N. Y.

DIPHTHERIA

"Children Who Might Live," by W. W. Bauer. *Hygeia*. Mar., 1930. Popular article.

"The Study of Poster Art Advances," by Z. B. Kimmey. *Poster Magazine*, Chicago, Ill. Jan., 1930. *35 cents*. Based on New York's high school poster contest. 4 diphtheria posters illustrated.

"Diphtheria in Ansonia." *Weekly Health Bulletin*, Connecticut State Department of Health. Mar. 3, 1930. Striking 10-year comparison of an anti-diphtheria city with two neglectful ones.

Announcement of the second New York State diphtheria poster contest. S. C. A. A., 105 East 22d St., New York, N. Y. 8 pages. *Free*. A happy idea is that the committee supplies the text (5 alternative forms) to appear on a poster.

Report blank for a local campaign prepared by the State Charities Aid Association, 105 East 22d St., New York, N. Y. 4 pages, 9 by 12 inches. Includes statistics, campaign organization, details of house to house canvass, organization of clinics (including details of equipment to be checked), publicity, how various groups coöperated, etc. A campaign could be planned with no other instructions. With a few changes could be used in any state or county. *Free*.

EDUCATIONAL MATERIAL

The following have been issued by the Metropolitan Life Insurance Co., New York (*free*):

The Board of Health—What it can and should do—with your support. 14 pp.

Overweight and Underweight—How to Treat Them. 32 pp. Menus, reducing exercises, weight reducing record.

What Is Rheumatism? 12 pp.

The Education of Insured Groups, by D. B. Armstrong. Reprint from *Long Island Medical Journal*. 5 pp.

Other sources:

New York Tuberculosis and Health Association, New York, N. Y.: How to Tell What in Popular Health Instruction, by Iago Galdston. Reprint from *A. J. P. H.* 4 pp. *Free*.

Superintendent of Documents, Washington, D. C.: Nine charts on nutrition and growth—pictures showing effects of adequate and inadequate diets on laboratory animals, prepared by Bureau of Home Economics. *50 cents*.

Superintendent of Documents: Heart Disease a Public Health Problem. Reprint, 5 pp. *5 cents*.

PRESS RELEASES

Recent press releases of state departments have covered the following topics: Child Health Conferences, Parrot Fever, Getting the Camps in Shape (Md.); Disinfection, Scarlet Fever, Sinus Disease (Ore.); Additional Water Safeguard for Travelers (Conn.); Tuberculosis on the Toboggan, Health of the State—February, Bottled Sunshine for Dark Winter Days, Winter Deaths from Heat, Carbon Monoxide Poisoning, More Measles Coming (Ia.); State Health Department Files 50th Report, Empty Sanatorium Beds Are Costly (N. Y.).

The U. S. Public Health Service has been running an extended series of releases based on the annual report and special reports of the Service.

Detroit has discussed the following: Smallpox is increasing, where Are Detroit's Tuberculosis Cases?

New York City offers a weekly review of The City's Health; also Street Sales of Uncovered Pretzels, Parrot Fever, New Serum for Pneumonia, Sixteen New Health Centers, Charter Change to Hush Noises.

MOTION PICTURES

"The Girl Scout Trail," a new Girl Scout picture, is supplied free through Visugraphic Pictures, 247 Park Ave., New York, N. Y.

BOOKS AND REPORTS

A Book of Crimes—*By A. S. MacNalty. London: Elkin Mathews and Marrot, Ltd.*, 1929. 328 pp. Price, $3.50.

The author has given the histories of twelve crimes, some famous and some little known, of the 17th, 18th, and 19th centuries—historically correct in many respects, though here and there interwoven with some romance. He is a facile writer, using language sometimes quaint, but always interesting.

The psychology of the crimes is interesting. From the medical standpoint, the description of the poisons used and their effects are the chief points.

The book can be recommended to all interested in criminology, and will serve to pass away a number of hours in an interesting manner for the average physician.

M. P. RAVENEL

Disease and the Man—*By George Draper. New York: Macmillan*, 1930. 270 pp. Price, $4.50.

In this new volume Draper has attempted to round out his earlier studies, published in 1924 under the title "Human Constitution." Most of the chapters consist of revisions of previously published papers representing his conclusions after 5 years additional experience with the Constitution Clinic of Columbia University.

The author, in his preface, states that in considering disease, it becomes essential for a complete understanding of any given case to understand the man himself. To do this successfully involves an investigation, not only of the usual clinical examination, but also of the four principal contributing factors: The morphological, physiological, immunological, and psychological aspects of the man. He emphasizes his belief that these four panels of personality are all coördinates in determining the susceptibility of the individual to any particular disease.

The book, as a whole, is one of unusual interest. Its texture, however, appears somewhat uneven. In some places the author is extremely technical; in others he descends to a frankly "lay" style. The result seems neither quite "scientific," nor quite "popular." Its chief fault technically is its lack of coherence, with considerable unnecessary repetition, apparently the result of merely collecting and reëditing a series of more or less loosely related studies, rather than attempting to rewrite the material into a unified whole.

The chapters on morphology and genetics are the most thorough and valuable. It is with this field that the author is primarily concerned, and the detailed discussion, particularly of his gastric ulcer and gall bladder types, is most revealing of the scope of his methods of investigation. In the chapter on the influence of sex, he has gathered a considerable amount of interesting material of somewhat elementary nature, and demonstrated its applicability to a small, rather carefully selected group of cases, in support of his hypothesis.

In his chapter on the psychological panel he has delved largely into standard works of other investigators and shown the value of such methods as a means of approach to the study of certain cases. His immunological panel is still largely in the speculative period, as there is very little scientific evidence at hand to support more than the most

theoretical consideration of its significance in respect to disease. The importance of correlating these various aspects of the individual in relation to the specific disease problem is well brought out, and the need of much further work in this direction indicated.

The book is one which should reach a fairly wide and discriminating public.

LAWRENCE W. SMITH

The Road to Health—*By John P. Koehler, M.D. Milwaukee Health Department,* 1929. 85 pp. Free.

Hats off to the Health Officer of Milwaukee! He has written a booklet on personal hygiene, which is published by the local health department and distributed free, presumably to the residents of the city. Fitting the pocket and only 85 pages in length, it still covers adequately the familiar ground of healthful living.

Captious critics might wish for more color and warmth in make-up and text. Other health officers will read it and convince themselves that they could do better. Let them try! Public health would receive a great impetus if others would attempt the publication of such a booklet and do half as well.

R. S. PATTERSON

Health Work in Soviet Russia—*By Anna J. Haines. New York: Vanguard Press,* 1928. Price, $.50.

This little book is one of the *Vanguard Studies of Soviet Russia,* edited by Jerome Davis of Yale University. It is the result of a study extending over several years during which the author had abundant opportunity for observation.

Some of the outstanding points brought out are that the Russian of today regards physical health as important a factor in life as education; that doctors are limited to a working day of 6 hours; that all workers in medical institutions, including doctors, nurses, orderlies, laundresses, stove men, chauffeurs, etc., are organized into the *Medical Workers Union;* that there are night sanatoriums for tuberculosis; and that the infant mortality rate dropped from 27 per 100 in 1913, to 17 in 1923.

The author holds that the Soviet Commissariat of Health has made a real contribution to the administration of the world's work, and that its influence on medical work in Russia is very real. She evidently believes that a better acquaintance will spread its influence to other countries. In Russia the emphasis on medical education has been shifted from laboratory research to practical service, though abundant time and opportunities are given for research.

Russia has for a number of years been such a closed country to the average person that one finds it difficult to evaluate the statements of the author, who has evidently become enthusiastic over the work done in that country.

M. P. RAVENEL

Healthful Living. The Why and the How—*By S. E. Bilik, M.D. New York: Scribner,* 1929. 261 pp. Price, $2.50.

Another book on the perennial subject of personal hygiene needs some distinguishing marks if it is to escape engulfment in the profusion of literature on this topic. This one is written in a breezy style which is neither difficult to peruse nor to comprehend. It has color and individuality and the author is outspoken in giving his own opinions, most of which, however, are sound and free from faddism. He admits having been inclined at one time or another toward various fads and even cults, but to his credit he has emerged from all such erroneous ways and the result, as printed here, is a commendable piece of work.

The usual material on personal hygiene is included. There is an excellent

chapter on exercise, a subject in which the author, as a former athletic director, seems particularly proficient. There is also an interesting discussion of the healing cults, which by its frankness and freedom from abuse demonstrates that the regular practitioner is the only safe general healer. The remainder of the book seldom rises above mediocrity in content, the chapter on diet, for example, being about the average in such books, or not quite fair in quality.

The lay reader would probably enjoy reading this book and would get much information. JAMES A. TOBEY

Schistosomiasis and Malaria in Relation to Irrigation—*By J. F. C. Haslam, M.C., M.D., M.R.C.P. Ed., D.P.H. London: His Majesty's Stationery Office,* May, 1929. 52 pp. Price, $.35.

This report deals with a subject of growing importance from the public health standpoint. As the population of the world increases, so must new lands be brought into cultivation, many of which require irrigation.

Schistosomiasis (endemic hematuria) is one of the most common of all diseases in certain parts of the world. It is said to be responsible for 25 per cent of the deaths in Egypt; while in some districts, 85 per cent of the agricultural population, and 54 per cent of the proprietors and artisans suffer from the infection. Indeed it is believed by some that these figures are too low. The building of dams and increase in the water supplies furnishes the water necessary for the life cycle of the causative worm. If the eggs do not reach water promptly, they die, and even when hatched, depend upon a fresh water snail as host. The increase of dams and reservoirs also furnishes a problem in regard to malaria, since water is needed for the life cycle of the mosquito.

The report is well done, and ends with three appendixes, the first giving the geographical bibliography of reported cases of schistosomiasis, the second the relation of irrigation to climate and to nutritive value of crops, and the third the rules enforced in the irrigation concessions in the Sudan. While the report relates only to parts of the British Empire, it contains much that will be of value to sanitarians in every country in which these problems are present and increasing. M. P. RAVENEL

Second Annual Report of Ohio Conference on Sewage Treatment—*Held at Marion, O., October 31, 1928. Columbus: State Department of Health,* 1929. 61 pp.

The second annual report of the Ohio Conference on Sewage Treatment, which was held in October, 1928, gives in the front abstracts of the papers and discussions. The papers include two on the operation of specific sewage treatment plants and one on the important subject of revenue from sewage sludge. On account of the importance of the Ohio sewer rental method of raising funds for sewage treatment and the general interest in this subject in the State of Ohio, some time was given to the discussion of this law. These are included in the report. ARTHUR P. MILLER

Practical Handbook for Diabetic Patients—*By Abraham Rudy, M.D. Boston: Barrows & Co.,* 1929. 361 pp. Price, $2.00.

This book is an important addition to the large number of handbooks for laymen on diabetes. Dr. Rudy recognizes the important fact that all types of patients suffering from diabetes cannot be treated alike. Each patient has certain family and racial characteristics which must be taken into consideration in treatment for any disease, especially one so chronic as diabetes.

The native American, with minor exceptions, will eat almost any kind of

food. The people of the Jewish and Italian races among whom diabetes is most prevalent have developed many idiosyncrasies, habits, and distastes for foods, which must be taken into consideration. The physician cannot in a few days or weeks of treatment change the food habits of a patient, gained from many generations of ancestors.

Dr. Rudy gives an excellent number of menus for various races, particularly Jews. The system of substitution diets is very ingenious and should be widely used.

The format of the book dispels the layman's fear of technicalities. The type is large and clear and easily comprehensible. The book should be recommended to every diabetic.

REUBEN FINKELSTEIN

Report of the Westchester County Sanitary Sewer Commission, 1929—This Commission, which was appointed by the Board of Supervisors of Westchester County, N. Y., in June, 1926, made an immediate study of sanitary conditions in the county and from that drew two main conclusions: (1) that the interior of the county, except for an area of 3 square miles in the Bronx Valley, was without adequate sewage disposal facilities and also without any real hope of relief other than through this Commission; (2) that almost all of the shore section discharged raw sewage into the Hudson River or Long Island Sound, either directly or through very limited treatment plants.

These conditions would have a decided effect on the growth of the county, because of the menace to health and on account of the established fact that a territory cannot reach its maximum growth without adequate sewage collection and disposal facilities. To correct the conditions found, the Commission is rapidly developing comprehensive plans. Four projects costing almost $13,000,000 are either completed or close to completion and the Commission's report to the Board of Supervisors on three other projects which will cost almost $10,000,000 is awaiting the action of that board. A preliminary and approximate estimate of the final cost to complete a sanitation program in Westchester County is almost $56,000,000. Such an expensive program as this is feasible only because the assessed valuation in this county is very high.

ARTHUR P. MILLER

The Hebrew Physician—*Moses Einhorn, M.D., and L. M. Herbert, Editors (Printed in Hebrew). 983 Park Avenue, New York.* Vol. 1—No. 2, 1929–1930.

The second issue of *The Hebrew Physician* (Harofeh Hoibri), the only Hebrew medical journal published outside of Palestine, has just made its appearance.

This consists of 180 pages, and contains numerous articles on general medical subjects, including a copy of the manuscript on "Hemorrhoids," by Shlomo Eben Ayub of Badrash, France (1265 A.D.). A special section is also devoted to new Hebrew medical terminology.

Home Nursing and Child Care—*By C. E. Turner, Dr.P.H., Nell Josephine Morgan, R.N., and Georgie B. Collins—Malden Health Series. Boston: Heath,* 1930. 282 pp. Price, $1.20.

The authors, in their preface, mention that the material is not new "except in organization and method of presentation." We agree with them. They have included some very fine, practical knowledge, in logical sequence. The book opens with "What nursing means to the home," and continues with "Selection and care of the sick room." The chapter on symptoms is followed by methods of taking temperature.

It has splendid chapters on infec-

tions, antisepsis and control of communicable diseases. Personal hygiene of childhood and youth is treated in a sane, practical manner. Actual, scientific and usable facts are given, though it seems to us these might have been presented in a less businesslike manner. Perhaps the authors are relying upon the instructors to animate the subject matter. They mention, for instance, that it is safer to give an egg to a preschool child for breakfast than for supper. If we were an adolescent we would like to know why. The book is filled with excellent, graphic illustrations; in fact, they actually "speak for themselves."

There are at present very few books which can be used as texts for students of home nursing and child care, whereas the demand to teach these subjects is growing by leaps and bounds. It seems to us that the majority of the textbooks available are too "grown up." This was written expressly for the upper junior and lower senior high school student and will, no doubt, be welcomed both by students and instructors of home nursing and child care.

HENRIETTA LANDAU

Handbook of **Bacteriology** for Nurses (*3d ed. rev.*)—*By Harry W. Carey, M.D. Philadelphia: Davis,* 1930. 282 pp., 43 ill. Price, $2.25.

As ten years had elapsed since the second edition of this useful handbook appeared, it was found necessary to rewrite the entire work and to enlarge it to meet the more exacting requirements of the National League for Nursing and the State Boards of Education. The needs of nurses traveling beyond our national borders were likewise met by the inclusion of some of the more common foreign diseases.

The book consists of 20 chapters, a series of laboratory exercises and demonstrations, glossary and index. Virtually every phase of bacteriology is treated with sufficient fullness to make it of value to many others than nurses. Bacteriophage has been omitted. The inclusion of chapters on bacteria in water and milk, pathogenic protozoa and diseases caused by unknown organisms makes this volume worthy of being on the shelves of all health officers and general practitioners. Of pedagogic value are the lists of review questions at the end of the various chapters.

Errors are exceedingly rare, but there is one in the illustration on page 197 where the male mosquito is designated as the female, and *vice versa*. However, this illustration is taken from Zinsser's well known text—where the same error is committed. Zinsser copied from Carroll, but the latter reference is not at hand to this reviewer.

C. F. ADAMS

Feeding the Family—*By Mary Swartz Rose, Ph.D. New York: Macmillan,* 1929. 476 pp. Price, $5.00.

The third edition of Dr. Rose's eminently practical and authoritative text should prove, as the previous editions have, an ever-present help to any family. All of the valuable material of the first two editions is carried over into this very complete new volume. In addition, the results of the most recent research concerning the various vitamins brings the work up to date in that connection and in Dr. Rose's very direct, simple, live style which means much to the understanding of the lay mind. New diet lists have been made and the tables of calories and dietary recipes which appeared to be so complete in the earlier editions have been revised and made still more comprehensive in this one. Every age, type, and occupation is taken into consideration in these plans, as well as the cost of the food necessary to carry them out.

Out of the 15 chapters which the book contains, 6 are given over to the

food necessary to maintain the growth of the child from babyhood to youth. A chapter each is given to the adult man, the adult woman, and the man or woman "after 50." These form the body of the book. They are preceded by two introductory chapters on the significance of food in relation to the maintenance of the entire body and the care of the "Digestive Mechanism," and followed by 3 chapters given over to family menus, and cost of preparing those menus.

The concluding chapter is devoted to food for the sick and convalescent and answers many a puzzling question for the anxious member of the family who has to meet this problem. After this come 100 full pages of an appendix containing the calorie portions of everyday foods, dietary recipes that are both palatable and healthy, a table of calories to be found in different foods, the practical fitting of foods to the family pocketbook, and, at last, the height-weight tables for different ages so that the families may prove for themselves the value of eating properly for health.

The whole book is written in a most attractive style and made still more attractive by a number of full page illustrations, several of which are in color.

LENNA L. MEANES

The Medical Museum. *Modern Developments, Organization and Technical Methods Based on a New System of Visual Teaching—By S. H. Daukes, O.B.E., M.D., D.P.H., D.T.M.&H., Director of The Wellcome Museum of Medical Science affiliated to The Bureau of Scientific Research. London: The Wellcome Foundation, Ltd.*, 1929. 183 pp.

Dr. Daukes has presented in a beautifully illustrated book methods of museum display and classification, with a reference list which includes the more important articles on museum technic. While the method of display shown in the some 30 half-tone plates is not new, it is perhaps better worked out in its details than any other previous presentation. The book should be of value to all those concerned in museum work and the methods can also be adapted to other types of educational display, particularly along the lines of preventive medicine and public health.

MAJOR GEORGE R. CALLENDER

Pathogénie et traitement de l'asthme bronchique. *Mémoires couronnées publiés par l'Académie Royale de la Médecine de Belgique.* Vol. 24—*By M. A. Haibe.* 42 pp. 1929.

This investigation was awarded the Simont prize of the Royal Belgian Academy of Medicine. It deals with "bronchitic asthmas" though recognizing the larger group of responses designated as "asthma." Hemolytic streptococcus occurs in the expectorations of 80 per cent of bronchitic asthmatics. Intradermal injection is a valuable indicator for the determination of the antigenic rôle of the isolated germs. Injections of vaccine, repeated at the same point, create a local refractory condition which tends to become general when one injects each time at a new point in the skin. At first the injections of vaccine provoke a considerable afflux of polynuclears in the diseased parts of the lung. They stimulate a leucocytosis of the blood and they alter the blood count, often disturbed in asthmatics, in the direction of a neutrophile polynucleosis.

The autovaccine therapy dries up the source of the antigenic streptococcus and suppresses or attenuates the symptoms of bronchitis and asthma.

The hemolytic streptococcus plays an antigenic rôle of first rank in bronchial asthma. Autovaccines prepared with this antigen give favorable results with many asthmatics, and these results are incomparably superior when treatment proceeds without loss of time.

C. A. KOFOID

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Age and Sex in Tuberculosis—Endogenous reinfection plays an important part in producing pulmonary tuberculosis in early adult years; waning immunity, environmental and industrial hazards are responsible for the disease in later adult life. These are some of the implications of this interesting article.

CUMMINS, S. L. Factors of Age, Sex and Occupation in Adult Pulmonary Tuberculosis, J. State Med., 38, 2: 99 (Feb.), 1930.

Early Diagnosis of Cancer—Schemes for stimulating periodic physical inspections in order to detect cancer while still in the operable stage are discussed. The British viewpoint has several novel features not included in the typical American discussion of this problem.

DONALDSON, M. Early Diagnosis and Treatment of Cancer, J. State Med., 38, 2: 88 (Feb.), 1930.

Physical Fitness Examinations—The relative importance of physical and social examinations are set forth in this discussion. "Health Examination" is a misnomer; the author prefers "Physical Fitness" for the good reasons given.

EMERSON, W. R. P. What is a Physical Fitness Examination?, New Eng. J. Med., 202, 7: 330 (Feb. 13), 1930.

Postvaccinal Encephalitis—A detailed and accurate presentation of what is known of the cases of encephalitis following vaccination in England and Holland. This intensely interesting paper deserves careful reading by every sanitarian.

FLEXNER, S. Postvaccinal Encephalitis and Allied Conditions, J. A. M. A., 94, 5: 305 (Feb. 1), 1930.

Dust and Tuberculosis—In the guinea pig it is possible to light up a quiescent tuberculous infection and render the focus progressive by dusting with siliceous dusts. Human cases need much more study than has thus far been given.

GARDNER, L. U. Will the Inhalation of Siliceous Dusts Activate a Partially Healed Focus of Tuberculous Infection?, Pub. Health Rep., 45, 6: 282 (Feb. 7), 1930.

Undulant Fever—A valuable series of papers concerning such important questions as differentiation between *Brucella abortus* and *Brucella melitensis* infections, laboratory diagnosis, bacteriology.

GIORDANO, A. S., and SENSENICH, R. L. Brucella Abortus Infection in Man.

CARPENTER, C. M., and BOAK, R. A. The Laboratory Diagnosis of Undulant Fever.

LYNCH, F. B., and CALLAN, A. M. Some Observations on the Agglutination of Br. Abortus, J. Lab. and Clin. Med., 15, 5: 421 (Feb.), 1930.

Correcting Case Rates—By determining the proportion of deaths from communicable diseases not previously reported as cases, one can correct the morbidity rate to that extent and thus make a more satisfactory fatality rate.

GREEN, H. W. Corrected Fatality Rates in Public Health Practice, Pub. Health Rep., 45, 4: 169 (Jan. 24), 1930.

Streptococci in Milk—Specific directions are given for identifying *Streptococcus epidemicus* and the streptococcus of scarlet fever in milk. How these tests are used to safeguard certified milk is described.

HARDENBERGH, J. G. The Identification and Significance of Hemolytic Streptococci in Milk, New Eng. J. Med., 202, 8: 373 (Feb. 20), 1930.

Poliomyelitis in Canada—Two good accounts of recent outbreaks of poliomyelitis (in Ottawa and Ontario) describe the methods of collecting and administering convalescent serum, and the results thereof.

LOMER, T. A., *et al.* Report of an Epidemic of Poliomyelitis in Ottawa, 1929 (and)

HARDMAN, R. P., *et al.* Poliomyelitis in Ontario, 1929. Canad. Pub. Health J., 21, 2: 53 and 76 (Feb.), 1930.

Scarlet Fever Immune Serum—Contacts given scarlet fever immune human serum were protected to a sufficient extent to cause the author to recommend this prophylactic treatment of young and infirm contacts.

MEADER, F. M. Scarlet Fever Prophylaxis, J. A. M. A., 94, 9: 622 (Mar. 1), 1930.

Measles Prophylaxis—Tunnicliff's antimeasles diplococcus serum protected three-quarters of the persons who received it within 5 days after exposure.

PETERMAN, M. G. Antimeasles Diplococcus Serum (Tunnicliff), Am. J. Dis. Child., 39, 2: 294 (Feb.), 1930.

Rheumatic Fever—A good general review of the newer knowledge of rheumatic fever covering definition, course, incidence and care, written for nurses. This subject seems to have been considered now from every angle and for every group who might possibly be interested.

ROTH, I. R. On Rheumatic Fever, Am. J. Nurs., 30, 2: 131 (Feb.), 1930.

Rabies Transmitted Through Milk?—Should persons drinking milk from a rabid cow be given the Pasteur treatment? The observations recorded lead to the opinion that the preventive treatment is not justified.

MUGRAVE, E. R. Milk-Borne Rabies, J. Lab. & Clin. Med., 15, 5: 460 (Feb.), 1930.

More About Rheumatic Fever—Patients with mitral disease of the heart who have had rheumatic fever in childhood have a chest deformity which displaces the left nipple upward and outward from its normal position.

SCHWARTZ, S. P. Displacement of the Left Nipple in Mitral Stenosis, Am. Heart J., 5, 3: 344 (Feb.), 1930.

Cancer—This paper bears every evidence of being a sound, inclusive, unbiased summary of the present status of our knowledge in regard to the etiology, the treatment, the prevention of cancer.

STALLYBRASS, C. O. Cancer—A Review of Recent Progress, Pub. Health, 43, 5: 135 (Feb.), 1930.

Rural Tuberculosis Incidence—Among a group of hospitalized children in Iowa only 16.5 per cent reacted to the intracutaneous tuberculin test. This is an indication how much less general is infection in rural than in urban districts.

TAYLOR, M. H. A Tuberculin Reaction Survey among Hospitalized Children in Iowa, Am. J. Dis. Child., 39, 2: 316 (Feb.), 1930.

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Newton, Mass.—The financial statement of the 1928 report of the Board of Health of Newton shows an appropriation of $49,684, or approximately $.87 per capita. Of this, $8,777, or 20.1 per cent of the total expenditure, were for child hygiene; $10,079 (23.1 per cent) for nursing, and $9,584 (22.0 per cent) for administration. The excellent diphtheria and scarlet fever records of the past few years are being continued, no deaths from the former having occurred since 1925, or from the latter since 1926. The physical examination of school children has been entirely taken over by the health department. As a result of this work, the percentage of defectives among school children has been reduced from 40 to 12 since 1924. The birth rate has increased from 15.36 to 17.54, and the death rate from 9.75 to 10.6 per 1,000 population.

New York State—Volume II of the 49th annual report of the New York State Department of Health contains the report of the Division of Vital Statistics for the year 1928. The death rate (13.1 per 1,000 population) has been higher only once since 1920. The birth rate of 19.2 was the lowest since complete registration; and the marriage rate, 18.6, the lowest since 1918. However, the infant mortality rate of 65 deaths under 1 year per 1,000 living births was, with the exception of the previous year, the lowest ever recorded. There were 1,295 deaths from puerperal causes, giving a maternal mortality rate of 5.56 per 1,000 births.

The important causes of death are excellently summarized by charts showing the death rates by cause, age and sex for New York City and the rest of the state. Heart disease ranks first as the chief cause of death, 22.2 and 23.5 per cent of all deaths in New York City and the rest of the state, respectively, belonging to this group. Pneumonia ranks second in New York City, with a proportionate mortality of 12.8 per cent, while second place for the rest of the state is accorded to cancer (9.5 per cent of all deaths). Mortalities from typhoid fever (1.8 per 100,000) and from diphtheria (7.4) were the lowest ever recorded with one exception. The death rate from tuberculosis was 82.7, a slight increase over 1927 due to an increase in the rate for New York City, a decrease being shown for the rest of the state. The death rates from diseases of the heart (297.9), cancer (126.7) and diabetes (26.4) were the highest ever recorded. The rate of deaths from automobile accidents (23.0) was higher than in 1927, the increase being due to greater mortality in the rest of the state, the New York City rate having decreased.

An amendment to the Vital Statistics Law enacted in 1929 provides for the payment of actual and necessary expenses to local registrars by their municipalities. The 1929 amendments to the Domestic Relations Law, as affecting the registration of marriages, require the approval of the judge of a children's court to be endorsed upon the marriage license application of girls under 16 years of age, and also require the return of the marriage license and certificate within 5 days after the marriage to the town or city clerk who issued it.

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Montreal—The personnel of Montreal's Department of Health has undergone a considerable reorganization and enlargement during the year 1928. The annual report for that year shows an increase in the staff of the Division of Child Hygiene from 11 full-time and 5

part-time inspecting physicians, 1 dentist, and 29 nurses, to 17 full-time physicians, 4 dentists, and 52 nurses. In the Division of Food Inspection, 6 veterinarian inspectors and 6 inspectors of pasteurization have been added, bringing the totals to 9 veterinarian and 7 pasteurization inspectors. The laboratory staff has increased from 3 to 9 members, including the addition of 3 milk bacteriologists.

The efficiency of school medical inspection has been improved by the redistricting of the city into 4 large nursing districts, each of which has been subdivided into 10 subdistricts with a nurse for each. The work of inspecting physicians has likewise been aided by the formation of 16 districts each comprising a baby clinic and supervised by an inspecting physician. During 1928, 68,148 pupils, or 53.24 per cent of those registered in the schools, were examined. Four hundred and fifty per 1,000 of the pupils examined showed one or more defects, excluding dental decay; 523.7 per 1,000 showed one or more dental defects.

A new system of statistical compilation is being organized in order to bring the municipal vital statistics to agreement with that of the Provincial Bureau of Health. For this reason the 1928 general death rate of 14.9 and the infant mortality rate of 143.8 per 1,000 births are not comparable with those of the past.

Arizona—The state of health of Arizona regarding communicable diseases is reported as satisfactory in the 8th biennial report of the State Board of Health for the years 1927–1928. A state milk control program was initiated in 1927 with the aid of the U. S. Public Health Service by the drafting of a Standard Milk Ordinance which was adopted by 17 towns.

Although crippled during 1927 because of the lack of funds, the Sheppard-Towner program of the Child Hygiene Division gave 46 lectures and talks to 1,252 persons, and 47 health conferences were held with a total of 606 mothers. In 1928, 84 lectures with an attendance of 1,226, and a total of 98 health conferences with 837 mothers attending were given. J. H. W.

Newark, N. J.—Newark has prepared an attractively bound 352 page report of the Department of Health for 1928. The volume is replete with cuts and graphs depicting the more outstanding phases of the department's work.

Newark's estimated population is 474,000. Its crude death rate is 11.6 per 1,000, which is reduced to a resident rate of 10.9. This is a slight increase over 1927, mainly due to the unusual prevalence of measles and pneumonia, to which was also attributed an increase of 0.5 in the infant mortality rate (63.8). The deaths from measles rose from 3 to 47, while an excess of 153 deaths from pneumonia was shown in 1928 over 1927. The specific death rate for diphtheria has also increased to a record high for the past 15 years; but in no instance was the victim an immunized child. The death rate for tuberculosis has risen slightly. A slight decrease (34) in the number of deaths from heart disease and apoplexy has occurred over 1927.

The physical examination of food handlers was started in 1920. In that year 2,314 examinations were made, which has increased to 16,779 in 1928. The effect of this work is clearly shown in the reduction in the positive tuberculosis found. In 1920, 9 positive cases were found per 1,000 examinations; in 1928 this figure was 0.3. A positive diagnosis was in each case made with the aid of sputum and X-ray findings. Venereal disease incidence among this group was exceptionally low, a percentage of 0.2 for the entire group being found. Only 1 typhoid carrier was

found; no case of diphtheria was ever detected.

The cost of this work was $9,000 annually; in 1928 the cost per examination was $.53.

Two Baby-Keep-Well stations were opened in 1928 to bring the total to 16 stations with 26 conferences a week. There were 51,189 visits made by nurses to 4,236 new-born infants, while 16,950 visits were made to the Baby-Keep-Well stations, a score of 5.2 and 1.7 visits per 1,000 births respectively. Midwife attendance has been consistently lowered, 20 per cent of the births being attended by midwives as against 46 per cent in 1918.

Bridgeport, Conn.—The annual health department report of 1928 occupies a portion of the municipal register of 523 pages. On the basis of an estimated population of 182,936, there is recorded a death rate of 9.4. The outstanding educational effort of the year was a cancer control campaign conducted in coöperation with the local medical society.

A symposium for physicians was addressed by 3 leading physicians in the cancer field. A meeting of nurses was addressed by two physicians, while a meeting for teachers was addressed by a foremost authority on cancer. The United Illuminating Company enclosed a leaflet, giving the early symptoms of cancer, in each of their October bills, totaling 50,000. Eight radio talks were given by the health officer, all having been endorsed by the local medical society. Some 5,200 persons attended public lectures, 530 inches of newspaper space were used, and over 66,000 pieces of literature were distributed. As a direct result of the campaign, 302 patients visited their physicians for diagnosis. Of this number, 81 were found to have early signs of cancer, 25 showed a malignant condition still operable, and 26 had cancer in an advanced stage, while the remainder showed no malignancy. The local medical society, as a result, has requested the Department of Health to establish diagnostic cancer clinics.

New Jersey—The child hygiene nurse appears to be increasing in favor among the communities of New Jersey, for, according to the 52d annual report of the New Jersey State Department of Health for 1929, 18 nurses were paid from local budgets in 1918 as compared with over 100 in 1928, and 55 paid by the state in 1918 as compared with 20 in 1928. The child hygiene nurse assists the community in maintaining the health of the child from the prenatal period to adolescence, including the school period. School nurses have been converted into child hygiene nurses, thus bringing the prenatal and preschool periods within the scope of the nurse's activities, a vital and important part of the correct approach to the child health problem. These nurses have supervised during the past year 5,034 expectant mothers, 18,764 babies, 21,090 preschool children, and 109,988 school children.

The state-wide diphtheria campaign, in which the department has taken an active part for several years, was continued and reports show that in 1928 over 125,000 children in New Jersey were given toxin-antitoxin at public clinics, a number almost equal to the total number of similar treatments in the preceding 7 years.

There were 324 persons desiring to be licensed as health officers, inspectors or as operators of sewage disposal or water treatment plants examined during the year. Only 98, or 30 per cent, of these were able to obtain a mark of 70 or more. The conclusion seems justified that without such tests many unqualified persons might obtain positions demanding specialized training of a high order.

The program of venereal disease con-

trol rests upon two principal activities —a case finding program, and public instruction as to the facts regarding venereal disease. There were 28,000 individuals who attended the 285 talks given throughout the state. Demonstration clinics presenting the newer drugs and methods to physicians were held in four counties during the year.

The legal control of physical connections between public potable water supplies and other unapproved supplies was secured during the year. New cross-connections are prohibited and those in use must be equipped with all bronze double check valves of an approved type, which are allowed only on yearly permit. Laboratory tests from 76 water supplies of roadside refreshment stands indicated 33, or nearly half, to be contaminated. The increasing importance of such violations of the Sanitary Code is self-evident.

New Jersey was relatively free from serious epidemics of disease during the year ending June 30, 1929. The death rate for the year 1928 was 12.04 per 1,000 population, within half a point of the lowest rate ever attained in the state. The 1928 birth rate (18.95 per 1,000) is the lowest since 1905. The infant mortality rate for 1928 is 65.6 per 1,000 babies born alive, comparing with 61.3 for 1927 and 70.3 for 1926.

BOOKS RECEIVED

RECENT ADVANCES IN PREVENTIVE MEDICINE. By J. F. C. Haslam, with a chapter on the Vitamins by S. J. Cowell. Philadelphia: Blakiston, 1930. 324 pp. Price, $3.50.

FACTORS IN THE SEX LIFE OF TWENTY-TWO HUNDRED WOMEN. By Katharine Bement Davis. New York: Harpers, 1929. 430 pp. Price, $3.50.

HEALTH VIA FOOD. By William Howard Hay. Buffalo: Sun-Diet Press, 1929. 299 pp. Price, $3.50.

TUBERCULOSIS IN PUBLIC SCHOOL CHILDREN. By Eugene L. Opie, H. R. M. Landis, F. Maurice McPhedran and H. W. Hetherington. Philadelphia: Henry Phipps Institute, University of Pennsylvania, 1929. 636 pp.

NEW USES FOR CAPITAL. By Robert S. Field. Philadelphia: The John C. Winston Co., 1930. 136 pp. Price, $1.25.

SHATTERING HEALTH SUPERSTITIONS. By Morris Fishbein. New York: Liveright, 1930. 245 pp. Price, $2.00.

PHILADELPHIA HOSPITAL AND HEALTH SURVEY, 1929. Conducted under the Auspices of a Citizens' Survey Committee. Philadelphia: Philadelphia Hospital and Health Survey Committee, 1930. 844 pp. Price, $3.00.

OUR NEW RELIGION. By H. A. L. Fisher. New York: Cape and Smith, 1930. 201 pp. Price, $2.50.

THE MEDICAL TRUST UNMASKED. By John L. Spivak. New York: Louis S. Siegfried, 1929. 170 pp. Price, $1.00.

INSOMNIA. HOW TO COMBAT IT. By Joseph Collins. New York: Appleton, 1930. 130 pp. Price, $1.50.

THE ARITHMETIC OF SEWAGE TREATMENT WORKS. By Karl Imhoff. Translated by Gordon M. Fair. New York: Wiley, 1929. 99 pp. Price, $2.00.

HOW GREAT CITIES ARE FED. By W. P. Wedden. New York: Heath, 1929. 302 pp. Price, $2.80.

THE BABY'S FIRST TWO YEARS. By Richard M. Smith. New rev. ed. New York: Houghton Mifflin, 1930. 159 pp. Price, $1.75.

CONTROL OF ENDEMIC DISEASES IN THE NETHERLANDS INDIES. Edited by The Netherlands Indies Medical and Sanitary Service. Landsdrukkerij-Weltevreden, 1929. 77 pp.

SOCIAL CONTROL OF THE MENTALLY DEFICIENT. By Stanley P. Davies. New York: Crowell, 1930. 389 pp. Price, $3.00.

EDUCATION AND THE SUMMER CAMP. AN EXPERIMENT. By Lloyd Burgess Sharp. New York, Teachers College, 1930. 114 pp. Price, $1.50.

HISTORY OF NURSING AND SOCIOLOGY. Compiled by a Sister of Charity of Emmitsburg, Md. Bridgeport: Brewer-Colgan Co., 1929. 279 pp. Price, $3.00.

THE HARVEY LECTURES. Delivered under the Auspices of The Harvey Society of New York, 1928–1929. Series XXIV. Baltimore: Williams & Wilkins, 1930. 216 pp. Price, $4.00.

ALL ABOUT THE BABY. The Beginnings of Human Life with Early Needs. By Belle Wood-Comstock. Mountain View, Calif.: Pacific Press Pub. Association, 1930. 364 pp. Price, $2.00.

NEWS FROM THE FIELD

MICHIGAN PUBLIC HEALTH ASSOCIATION

THE Ninth Annual Conference of the Michigan Public Health Association in coöperation with the Michigan Department of Health was held on January 8, 9, and 10 in Lansing, Mich. The following officers were elected: President, Don M. Griswold, M.D.; Vice President, Carrie Webster; Secretary-Treasurer, W. J. V. Deacon, M.D.; and Representative on Governing Council of the A. P. H. A., Guy L. Kiefer, M.D.

YALE SCHOOL OF MEDICINE

THE General Education Board of New York has made a gift of $400,000 to the Yale School of Medicine. The announcement of the gift was made by Dean Milton C. Winternitz of the School of Medicine. This supplements a $2,000,000 gift from the same board and Rockefeller Foundation a year ago. The money is to be used for further development on the site of the Sterling Hall of Medicine, and also for other buildings.

TEXAS WATER WORKS SHORT SCHOOL

THE Twelfth Texas Water Works Short School was held January 27–30, with a total of 272 registrants. The attendance at the laboratory sessions for the first two days broke all previous records with almost 100 present.

John R. Baylis of Chicago presented discussions on two subjects: "The Developments in the Treatment of Highly Polluted Water in the Removal of Bad Tastes and Odors," and "Conclusions at the Chicago Filtration Plant."

Waco, Tex., was selected as the next annual meeting place. The following officers were elected: President, L. A. Grimes; First Vice-President, W. H. Deaton; Second Vice-President, Bud A. Randolph; Third Vice-President, J. R. John; Fourth Vice-President, George Mincy; Secretary, V. M. Ehlers; Treasurer, E. G. Eggert, and Editor, Ella G. White.

Among the resolutions passed is the following:

WHEREAS, the American Public Health Association is to hold its Annual Meeting in Fort Worth, Tex., the latter part of next October, and

WHEREAS, this organization includes in its membership a section for laboratory workers and a section for public health engineers; therefore, be it

RESOLVED, first, that we give the various Fort Worth local committees our support in making a success of this meeting; second, that the secretary be instructed to prepare a chart or exhibit which will be representative of our organization and will indicate the activities and objectives of our organization.

DR. PARRAN, NEW YORK COMMISSIONER OF HEALTH

THOMAS J. Parran, Jr., M.D., has been named Commissioner of Health of New York State by Governor Roosevelt. Dr. Parran took office on March 1. He has been Assistant Surgeon General of the U. S. Public Health Service and is widely known in the public health field.

METROPOLITAN AREA FOOD AND HEALTH OFFICIALS FORM NEW ASSOCIATION

JUDGE B. A. Pyrke, New York State Commissioner of Agriculture and Markets, was elected president of a new association of federal, state, county and city food and health officials of the metropolitan area formed March 5 in New York City.

Forty food and health officials attended the meeting representing the federal government, the states New York, New Jersey and Connecticut, and the following cities: New York, Albany, Port Chester, Yonkers, Riverhead, Newark, Montclair, Trenton, Hackensack, Orange, East Orange, Jersey City, Asbury Park, Plainfield, Elizabeth, Paterson, New Haven, and Greenwich.

The purpose of the organization is to bring together officials concerned with food and public health work so they may discuss common problems, exchange notes, and coördinate and correlate activities to enforce more effectively their various laws and ordinances.

The first meeting of the organization was opened under the temporary chairmanship of W. S. Frisbie, in charge of coöperation, Food, Drug and Insecticide Administration, U. S. Department of Agriculture, Washington, D. C. Problems relating to canned foods, poultry and milk were considered and discussed. Other officers elected were W. R. M. Wharton, Chief of Eastern District, Food, Drug and Insecticide Administration, as vice-president, and Joseph Calloway, Chief of New York Station, F. D. I. Administration, as secretary.

The next meeting will be held on the first Wednesday in June. The group expressed a desire to have arranged for them at that time a display of various types of illegal poultry which have in the past been found on the market.

SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE annual meeting of the Southern California Public Health Association was held on February 14 in San Francisco. The following officers were elected: President, Dr. George Parrish; President-elect, Dr. Sven Lokrantz; 1st Vice President, Dr. W. B. Wells; 2d Vice President, Dr. A. M. Lesem; Secretary-Treasurer, Dr. Giles S. Porter; and Head of Executive Committee, Dr. J. L. Pomeroy.

A resolution was passed recommending that papers presented at sectional meetings be made available through the A. P. H. A. to members of all affiliated health associations, supporting the resolutions of the West Virginia Public Health Association (*A. J. P. H.*, 20, 2: 238 (Feb.), 1930).

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE Annual Meeting of the Northern California Public Health Association was held on the campus of Leland Stanford University, Palo Alto, on January 11.

The officers elected for the coming year are: President, Dr. Adelaide Brown; Vice Presidents, Dr. Guy Millberry, Dr. Thomas A. Storey, and Dr. Karl F. Meyer; Secretary, Dr. Walter H. Brown; and Treasurer, Mary E. Davis, R.N.

The Association officially approved the request of the West Virginia Public Health Association that the A. P. H. A. work out a method whereby the papers in the local Associations might be published and made available for the various workers in the public health field.

UTICA'S MOST USEFUL CITIZEN FOR 1929

CONCLUDING that without health the community and its citizens cannot prosper, the Board of Awards of the Utica (N. Y.) *Observer-Dispatch* decided that any outstanding contribution to the health of Utica deserves first consideration and highest recognition. Therefore Walter G. Hollingsworth, M.D., Fellow, A. P. H. A., was selected as Utica's most useful citizen for 1929 because of his work in the Division of Food and Hygiene.

MILK AND CREAM CONTESTS

THE U. S. Bureau of Dairy Industry has prepared a department circular, *How to Conduct Milk and Cream Contests* (Circular 384–C), of which a revised edition is now available for dis-

tribution. This circular offers simple and definite suggestions for conducting such contests and explains the approved methods of scoring. It includes a model score card and several tables which show how to make deductions from a perfect score. The recommended score card allows a maximum of 45 points out of 100 for low bacterial count, 25 points for flavor and odor, 10 points for sediment, 15 points for temperature or acidity, and 5 points for the condition of the bottle and cap. Apply to Office of Information, U. S. Department of Agriculture, Washington, D. C.

MEXICANS AND PUBLIC HEALTH

SENOR Alfonso Isunza, of Vera Cruz, has been visiting Texas making an intensive study and inspection tour of the various sanitary projects and improvements, including water supplies, sewage disposal, milk sanitation, chlorination, and mosquito control, under the direction of the Texas State Health Officer and the Sanitary Engineering Staff. This study is along the same lines as one made last summer by Senor Anastasio Guzman of the engineering staff of the University of Mexico. These gentlemen with some ten or more other prominent engineers in the Republic of Mexico have indicated their intention of attending the 59th Annual Meeting of the American Public Health Association.

NEW JERSEY NURSES TO MEET

THE annual state conference of the New Jersey Nurses will be held in Elizabeth, N. J., from April 10 to 12. Some of the organizations meeting will be the League of Nursing Education, New Jersey State Nurses Association, New Jersey State Association for Public Health Nursing and the Northern New Jersey Federation of Visiting Nurse Associations.

MENTAL HYGIENE SPEAKERS

THE International Congress for Mental Hygiene, May 5–10, 1930, is to be attended by many foreign delegates. Some of these will be available for lecture engagements. Their interests cover a very wide range, and it is probable that a suitable speaker could be found for most any group interested in human behavior. The National Committee for Mental Hygiene will provide information about these visitors, their subjects, their possible itinerary, and availability to any organization interest. Apply to Dr. George S. Stevenson, 370 Seventh Avenue, New York, N. Y.

PERSONALS

DR. JAMES J. DURRETT, Chief of Drug Control, U. S. Department of Agriculture, was elected February 12, 1930, by the State Committee of Public Health of Alabama to be State Health Officer to succeed Dr. Stuart Graves, Dean of the School of Medicine of the University of Alabama, who was loaned by the University to be State Health Officer pro tempore.

DR. ARTHUR W. K. AKERLEY, for many years a member of the A. P. H. A., died at his home on Flathead Lake, Somers, Mont., on January 30, 1930, at the age of 62 years.

ALICE DUFF, formerly with the Preston County Health Unit, is now a member of the new Monongahela County Health Unit, Morgantown, W. Va.

NELSON E. CLEMENS, D.V.M., has been appointed Health Officer of Hayward,

Calif., to succeed Dr. Fred William Browning, who died recently.

STEPHEN MALONEY, Secretary of the Massachusetts Association of Boards of Health, died suddenly in January of this year.

DR. WILLIAM H. CULLEN, Health Officer of Brasher Falls, N. Y., died on January 28 of pneumonia.

JAMES LOUCHEIM, registrar of vital statistics for Lawrence, N. Y., since 1918, has been reappointed for a period of 4 years. He is believed to be the oldest registrar in the state—he is now 84 years old.

DR. C. FLOYD HAVILAND, superintendent of the Manhattan State Hospital and former State Hospital Commissioner, died in Cairo, Egypt, in January.

FRANCIS E. FRONCZAK, M.D., Health Commissioner of Buffalo, N. Y., was unanimously elected a Fellow of the Royal Institute of Public Health by the Institute at a meeting held in London, England, recently.

CONFERENCES

Apr. 3–5, Progressive Education Association, Washington, D. C.

Apr. 7–10, Florida State Conference of Social Work, Jacksonville, Fla.

Apr. 8–11, Short Course on Water Purification and Sewage Treatment, University of Florida, Gainesville, Fla.

Apr. 9–11, Iowa Water Works Operators School, Iowa City, Ia.

Apr. 10–12, New Jersey State Nurses Convention, Elizabeth, N. J.

Apr. 22–23, Arizona Public Health Association, Phoenix, Ariz.

May 5, Texas Health Officers' Conference, Mineral Wells, Tex.

May 5–10, First International Congress on Mental Hygiene, Washington, D.C.

May 6–8, Annual Meeting, State Medical Association of Texas, Mineral Wells, Tex.

June 2, week of, American Water Works Association, St. Louis, Mo.

June 6–14, National Conference of Social Work, Boston, Mass.

June 12–14, Western Branch of American Public Health Association, Salt Lake City, Utah

June 18–19, State and Provincial Health Authorities of North America, Washington, D. C.

June 20–21, Conference of the Surgeon General, Washington, D. C.

FOREIGN

May 19–21, Second International Malaria Congress, Algiers, Algeria

June 4–9, Congress of Royal Institute of Public Health, Portsmouth, England

June 21–28, Royal Sanitary Institute, 41st Congress and Health Exhibition, Margate, England

Aug. 3–9, Second International Congress for Sex Research, London, England

Aug. 4–9, International Veterinary Congress, London, England

59th ANNUAL MEETING and 12th ANNUAL HEALTH EXHIBIT

Fort Worth, Texas, October 27–30, 1930

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